ELECTRIC RAILWAY JOURNAL

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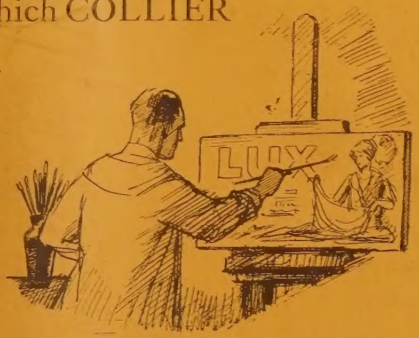
JUST as it has taken years of faithful adherence to ideals of service to build and maintain the street car lines—so has it taken years of faithful study and application to build into Car Card Advertising the value which COLLIER SERVICE has created.



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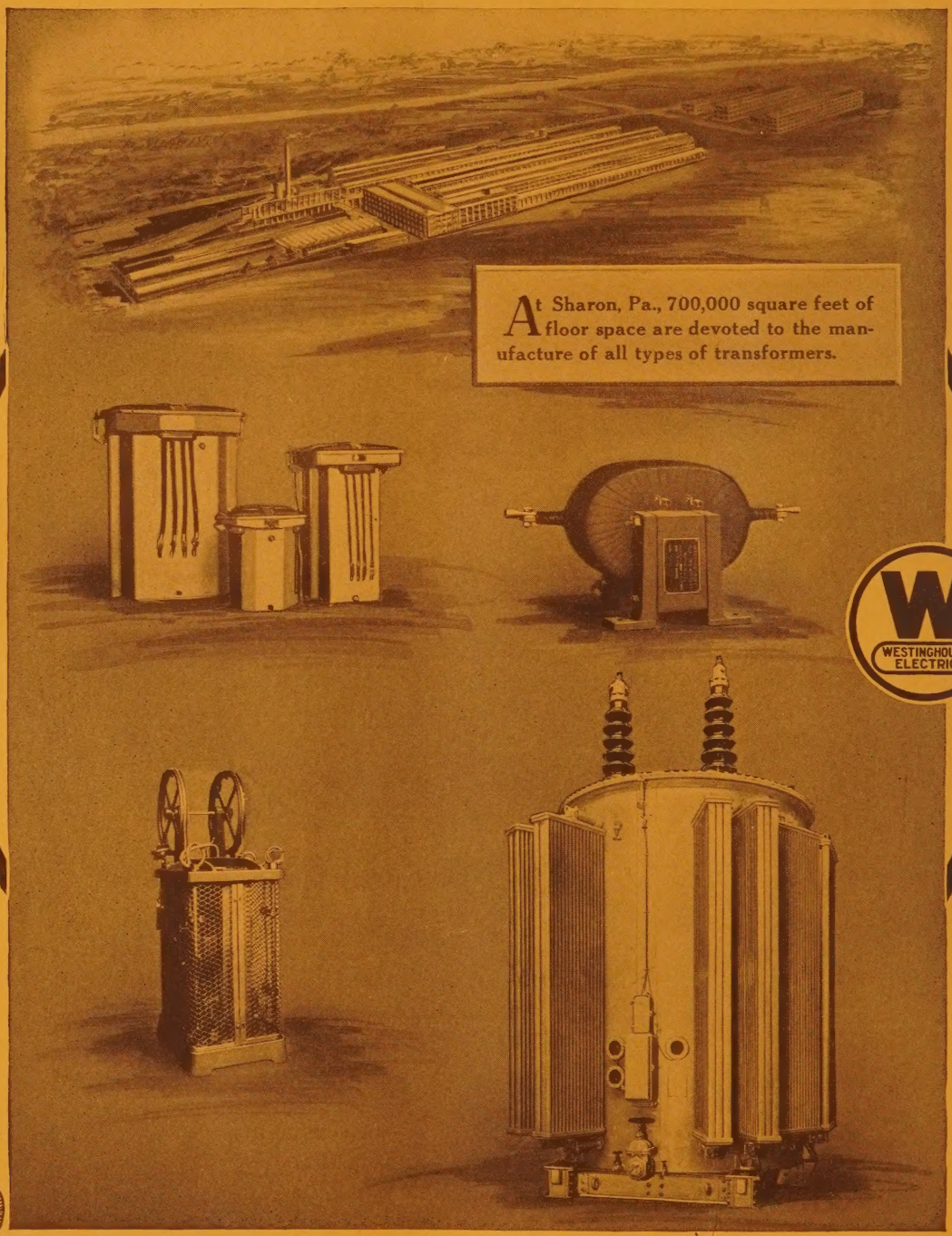
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Electric Railway Journal

Consolidation of Street Railway Journal and Electric Railway Review

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MORRIS BUCK, *Managing Editor*

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Obsolete Equipment Affects Public Opinion

IN A PAPER before the annual summer meeting of the Central Electric Railway Association at French Lick, Ind., Charles Gordon, Western editor ELECTRIC RAILWAY JOURNAL, suggested that the element of style should be given serious consideration in judging the ride-merchandising value of street car designs.

This opens a progressive line of thought. If stylish, rakish and attractive looking cars create an instinctive desire to ride, then it follows that aged, old-fashioned looking equipment tends to limit riding to those who are forced to use the cars by lack of other facilities.

But obsolete equipment does even more harm than that. It creates a popular impression that the very industry itself is obsolete. It causes people to believe that the development of car design for rail operation is at a standstill. It leads them readily to accept the idea that transportation by rail in city streets is itself an obsolete mode of travel.

This impression is further stimulated by contrast with the automotive vehicle—both private cars and buses. People have seen the automotive vehicle radically improved in a very few years. They have come to have confidence in the ability and progressiveness of automotive designers and manufacturers. They tend, therefore, to accept readily the opinions advanced by the occasional enthusiast who predicts the doom of the rail-borne electric car.

To overcome this easily spread idea, they must be given more information about the place of the street and interurban car in the modern scheme of transportation. Publicity is essential in accomplishing this. But no amount of publicity can overcome the unpopularity created by awkward, cumbersome, heavy and noisy cars in the streets. To overcome the impression that the electric railway is a back number it is essential that every effort be expended toward the retirement of obsolete looking equipment.

Every Man a Salesman for the Service

COMPLETE as it was, the brief of the Northrn Texas Traction Company, Fort Worth, Tex., that won for it the Coffin prize did not exhaust the subject of selling service so far as that company was concerned. This was strikingly instanced at a recent weekly staff meeting attended by one of the editors of this paper. The proccedings were particularly interesting because the program consisted largely of subjects which had been laid out at a previous meeting, before any one even knew that a visitor was to be in town and attend.

The session lasted about three hours. Every subject discussed had something to do with the sale of rides. Running through a number of subjects, from car painting to the posting of car stop signs, every item taken up at that meeting was discussed from the angle of building more car rides.

In connection with one particular merchandising campaign which was in preparation, a number of suitable, attractive slogans were desired. Every man at that meeting was called on to read a list of slogans which he had prepared. These lists included many good slogans; some were not so good. All of them were frankly criticised, and many suggestions were developed from the criticism.

Entirely aside from the question of the availability of the slogans, every man in that meeting was thinking about the sale of transportation. Unquestionably, each man took back with him to his own department a keener realization that transportation is a service which can and must be merchandised and that the work of every department, from mechanical to claims, should be carried on with the one common object of selling more car rides.

The name of the property has been mentioned in this discussion not with a desire to pat the officials on the back. They don't need it. The meeting described does, however, illustrate one of the ways in which the coveted Coffin honor was won by this comparatively small property way down in Texas. Other traffic sales methods used by the company are described elsewhere in this issue. In exact proportion to the degree in which this need for merchandising the service is being recognized and turned to advantage may the electric railway of today expect to succeed in converting automobilists and pedestrians into car riders.

Receivers Race to Forestall Default

QUICK work has been done in devising the plan for the readjustment of the finances of the Detroit United Railway. There was need for quick work. The sum of $250,000 is required by July 1 to avoid default in the sinking fund payment. The plan now put forward, if approved, will meet this demand. In financial parlance it is a readjustment, not a financial reorganization, that is proposed. Foreclosure and reorganization will follow only if the plan now presented to the stockholders and the creditors is not approved by them, but this appears unlikely. So far there has been no default in the payment of interest or in meeting the sinking fund requirements. The race by the receivers is to forestall such contingency.

It is up to the stockholders. They are being asked to put in an additional $6,150,000. The assessment they are called upon to meet by July 1 is 40 per cent. For the new money they will get new general mortgage bonds which will become a first lien in 1929. Creditors are being asked to accept the same security. Their choice is between subscribing to the plan and trying to protect themselves if the property of the company

should have to be disposed of at forced sale. Of the many noteworthy aspects of the new plan, the one calling for a change in the conditions surrounding the stock deserves attention. There is only one issue now—all common. Preferred stock and two classes of common stock are proposed. Ultimately, one of these issues of common stock may prove to be quite valuable. The very slim equity behind it at the inception of the plan ranks it as highly speculative, but if the plan works out financially as the operating managers anticipate that very slim equity may result in its eventually becoming very valuable.

The plan was published in the ELECTRIC RAILWAY JOURNAL for June 20 in detail sufficient to permit it to be interpreted intelligently. The engineers for the property estimate a balance available for the coming year of $697,288, presaged on the adoption of the plan and the assumption that an increase in rates will be permitted. This permission is now being sought. Rates are inordinately low. Competition, now partly overcome, appeared to dictate a rate policy which has turned out to be a tactical error.

So far as the plans ahead for the property have been divulged they contemplate no radical change from the program laid down previous to the receivership. Contingent upon the approval of the plan at the meeting on June 29 the program will be carried forward rigorously to fulfillment. If the conditions that beset the Detroit United were peculiar to that property the need would not exist for extended comment, but such is not the case. For this reason the readjustment plan, contemplating as it does a raise in rates, greater use of the bus, further articulation of railway and bus and more intensive cultivation of business, are of more than academic interest. Fundamentally the program is sound. Time alone will write the final appraisal on the sagacity displayed in carrying out the moves that are contemplated.

"Excelsior" Is a Poor Watchword for the Architect

PITTSBURGH is conducting an enthusiastic drive to secure funds for the erection of a "cathedral of learning." No one will deny that an increase in its educational facilities is likely to be advantageous to that or any other city. One feature of the proposed plan, however, may well arouse grave misgivings. To raise the edifice housing this university high above all other structures round about—and there are already many tall buildings in Pittsburgh—would be a serious mistake from several points of view.

Whether the skyscraper is a type of architecture that will produce a convenient and suitable home for an institution of learning is a question that may well be left to the educators. The apparent indorsement of the many-storied building by its selection for this use, however, might have far-reaching effects of a most unfortunate kind. This phase of the matter is one that concerns every one interested in orderly, well-planned civic development, in which class nearly all transportation men will be found.

Outside of such large cities as New York, Chicago and Philadelphia even the transportation men themselves, perhaps, do not fully realize the evils of the skyscraper. Concentration of enormous numbers of people on a small ground area presents a transit problem that is beyond the possibility of efficient and economical solution with the facilities now available.

Many other valid objections can be raised against the extremely tall building, but the congestion thereby created is alone enough to condemn it. Few dissenting voices will be heard among those people in the larger cities who suffer daily from this cause. Yet the small towns continue to yearn for taller and taller buildings. It is to be hoped that Pittsburgh will not add impetus to this worship of false gods by building a cathedral of learning in the shape of a towering skyscraper.

Trunk Lines Embark in Operation of Buses

BUSES are to be operated by the New York, New Haven & Hartford Railroad within the territory served by its lines. For this purpose a subsidiary with a capital of $1,000,000 has been organized. The step is significant. In this respect the New Haven is aligning itself with the Boston & Maine Railroad with similar plans for bus development in northern New England. Other railroads, including the Great Northern and the Chicago, Milwaukee & St. Paul Railroad, have also recently announced plans for operating buses.

Some such bus policy is inevitable on the part of the large steam railroads. The same reasons apply that compelled electric railways to install bus lines in city and interurban service. It is obvious that, by and large, the existing transportation system can furnish much more satisfactory service than can the independent, particularly in substantially parallel service. Two dissimilar lines under the same management permit one to be used as a complement to the other to reduce duplication of service. Particularly significant was the confession by the New Haven Railroad in its official statement of the character of some of the circuitous runs now necessary by train. Here especially does the railroad contemplate the use of the bus. This is wise.

So long as the states continue to spend vast sums on the construction and maintenance of improved highways, which can be used by the motor common carrier at little or no greater cost than by the private user, the number of bus and motor carriers is bound to increase. This does not mean that the automobile is a more comfortable or efficient means of transportation than is the steam-drawn train. But it does mean that for certain classes of service—as with sparse traffic—it can be operated successfully and perhaps can be used in other lines also to advantage.

The danger is always inherent of overestimating the earning and strategic value of new forms of transportation. If the steam railroads do not, in connection with bus operation, repeat mistakes of the past, they will benefit, as will also the territories which they serve. They should "make haste slowly" and go forward intelligently. Entirely aside from the many injustices in the present situation—and there are grave regulatory and other injustices—that work a temporary advantage in favor of the bus, the doom of the rural train made up of one locomotive, one baggage car and one combination smoker and passenger coach, all of the vintage of 1895 operated once a day in either direction, was sounded a long while ago. The wonder is that the steam railroads were so long in discovering it.

Car Riding Increased 28 per Cent

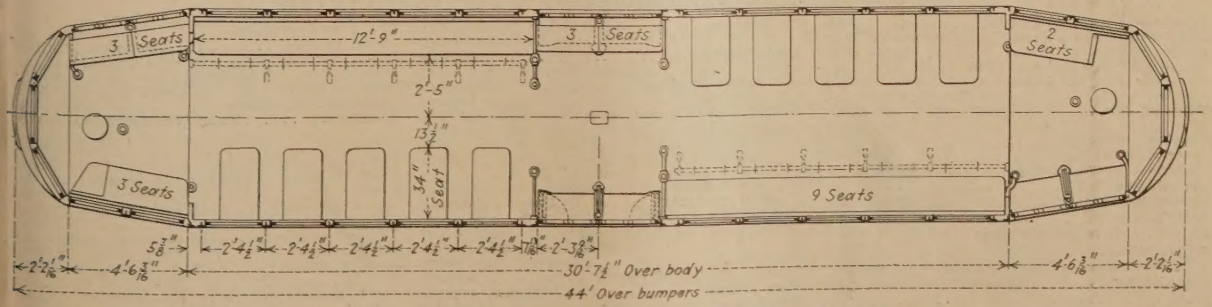
New Brooklyn Cars Increase Schedule Speed Due to Better Acceleration and Retardation and Decreased Loading Time — Lesser Weight and Better Schedules Reduce Energy Consumption—Other Features Are Incorporated in Last Cars Delivered

SERVICE requirements and operating conditions in Brooklyn are changing continually. The opening up of a new subway line or the extension of express service on one of the rapid transit lines affects travel on the various surface lines. This is shown sometimes by shifting of travel from one line to another, sometimes by a decrease and sometimes by an increase in the riding. It also affects the load in regard to the direction that people travel. An analysis of operating economies and changes which can be definitely attributed to the new cars of the Brooklyn City Railroad is therefore quite difficult, but by making an analysis on lines which are least affected by other conditions many economies are found to have resulted from the use of the new cars. These include increases in scheduled speeds, decreases in length of stops, and increased riding on the lines immediately after the introduction of this particular type of car. The last order for 335 cars was placed in November, 1924. Of these, 150 were built by the J. G. Brill Company, 100 by the St. Louis Car Company and 85 by the Osgood-Bradley Car Company. These cars, together with the 200 cars purchased in 1923, make a total of 535 double-end and pay-as-you-pass cars of this type ordered for Brooklyn service. Cars purchased on the first orders were described in ELECTRIC RAILWAY JOURNAL for Oct. 27, 1923, page 739. The last orders are for cars of the same general exterior appearance, and of essentially the same construction. However, there are a number of changes which are of particular interest, such as staggered seating, replaceable vestibules, power cables inside car, and rearranged barriers for controlling passenger movement. These have been found necessary by close study of the operation of the first cars.

Entrance at the Front and Exit at Center Separate Flow of Traffic and Reduce Time Consumed in Stops

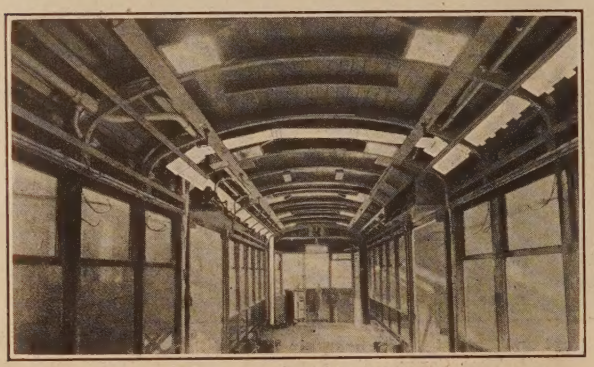
Previous to the ordering of the first cars, an extended survey was made to determine factors which would influence the type of car to be bought. The large variation in the number of passengers carried during rush periods as compared with non-rush periods and also the variation on different lines of the system showed that it was advisable to have a car which could be arranged for either one-man or two-man operation. The pay-as-you-pass car, with entrance at the front and exit at the center, was decided upon as a result of a survey made to determine where people stood on the sidewalks at corners while waiting for a car. This showed that at most intersecting streets, at which there are near-side stops, passengers will wait at a point in line with the building line of the street, and a check of various types of cars in service showed that many people were walking the full length of a car after it had stopped in order to board it.

The theory that this type of car used in connection with near-side stops in Brooklyn would reduce the length of stop required for loading a certain number of



Staggered Seating Arrangement Gives Aisle Width of 3 Ft. 6¼ In.

passengers has been borne out by surveys made on lines immediately after the new cars were placed in service. On the Flatbush Avenue line, the average duration of stop was decreased from eight seconds to 6.2 seconds through the use of the new cars. Comparison was made for the month of December previous to the introduction of the new cars into service with the December following the use of the cars. This showed that the schedule speed on the Flatbush Avenue line increased from 9.25 m.p.h. to 9.9 m.p.h. At the same time, the number of stops per mile made by the cars has increased from 8 to 10. This increased operating scheduled speed has resulted from several other factors which are features of the new car design. The average acceleration of the new cars is 1.7 m.p.h.p.s. as compared with 1.5 m.p.h.p.s. for cars previously used. The average rate of retardation under all conditions of loading was increased from 1.52 to 1.73 m.p.h.p.s. This increased braking rate is made possible through use of the



Main Power Circuits Are Installed in Metal Ducts Inside

empty and load brake on these cars. This provides for automatic adjustment of the braking pressure in proportion to the load carried by the car so that a uniform braking rate is obtained regardless of the load. On cars without this device braking pressure is set at the maximum which will not cause slipping of the wheels with an empty car and the rate of retardation decreases as the passenger load increases. The average braking rate for a loaded car is thus reduced over what is obtained with automatic adjustment.

RUNNING TIME REDUCED FOUR TO SEVEN MINUTES

The beneficial effect of increased acceleration and retardation and decreased length of stop has resulted in a reduction in running time of from four to seven minutes on lines which have been equipped with the new cars. These lines vary in length from 6 to 8 miles. The number of passengers has increased rapidly with the use of new cars. Shorter headways have been necessary in some cases to care for the additional business, so that the reduction in running time has not permitted the removal of cars from service. The layover at the end of the line also has not been changed. The standard practice in Brooklyn is to provide a layover equal to the headway if this is less than four minutes, the maximum layover allowed.

The operating features of the cars just referred to together with the reduction in weight have also produced economies in energy consumption. These cars, averaging 21 tons each, give a reduction in weight of about 5 tons per car over previous equipment. Since service was started with new cars on the Gates Avenue line, there has been a reduction of four minutes in the power-on period per hour or from 23.2 minutes to 19.2 minutes. This has resulted in a reduction of 6.73 per cent in the power-on period for all cars on the line. Cars in Brooklyn are equipped with Arthur power saving recorders, so that accurate comparison of whole power-on periods can be made. The energy consumption for the new type of cars on representative lines is approximately 3.1 kw.-hr. per car-mile.

LARGE INCREASE IN RIDING

The increase in car riding is shown by comparison of the passengers carried on the Flatbush Avenue line and on the Richmond Hill line for December previous to the use of the cars with the month of December after the cars were placed in service. The Flatbush Avenue line was entirely equipped with the new type of cars and 80 per cent of the service on the Richmond Hill line was given with the new equipment. These particular lines are taken for comparison as the passengers carried were not influenced by other varying conditions to the extent that occurs on some lines. The Flatbush Avenue line shows an increase of 401,965 passengers and the Richmond Hill line an increase of 221,825 passengers. The combined increase for these two lines is 28.2 per cent.

Of course, it is to be expected that maintenance costs will be decreased while the cars are new, but certain other economies in maintenance cost will result through the reduction in the number of trucks and motors required for this type of car over types previously used. Thus, considering a comparison on a seat basis, the 334 cars purchased on the last orders will replace 371 cars of older type. The same number of seats will thus be provided with 37 less cars, and there will be 74 less trucks and 148 less motors to maintain. The number of extra cars needed at the present time to take care of cars withheld from service for repairs, cleaning, etc., is about 4 per cent of the total. General overhauling

DIMENSIONS, WEIGHTS AND EQUIPMENT OF NEW BROOKLYN CARS

Number of cars ordered	335
Date order was placed	November, 1924
Date of delivery	June, 1925
Builder of car body	The J. G. Brill Co., St. Louis Car Co. and Osgood Bradley Car Co.
Type of car	Closed motor, one-man, two-man
Seating capacity	50
Weight, total	42,000 lb.
Bolster centers, length	21 ft. 6 in.
Length over all	44 ft. 0 in.
Truck wheelbase	5 ft. 4 in.
Width over all	8 ft. 4 in.
Height, rail to trolley base	10 ft., 9½ in.
Body	Steel
Interior trim	Cherry, stained magogany
Headlining	Agasote and Nevasplit
Roof	Arch
Air brakes	Safety Car Devices Co. with variable load brake
Anti-climbers	Hedley
Axles	Carnegie heat treated steel
Car buzzer system	Faraday
Car trimmings	Statuary bronze
Center and side bearings	Oil retaining type center bearings; special plain side bearings
Conduits and junction boxes	Pressed steel duct with aluminum junction boxes
Control	General Electric K-72A
Curtain fixtures	Acme and National
Curtain material	DuPont Fabrikoid
Destination signs	Hunter
Door operating mechanism	Consolidated and National Pneumatic
Enamel	Devoe & Raynolds
Energy saving device	Arthur
Fare boxes	Johnson, type J
Fenders or wheelguards	Root automatic
Gears and pinions	Nuttall BP
Hand brakes	Peacock staffless
Heater equipment	Gold Car Heating Co.
Headlights	Ohio Brass, Brooklyn type ZP
Journal boxes	Brill and St. Louis
Lightning arresters	Type MP
Motors	Four Westinghouse 510-A, inside hung
Registers	International
Sanders	Ohio Brass
Sash fixtures	Dayton Manufacturing Co.
Seats	Cherry, slat type
Slack adjuster	Westinghouse, type J
Step treads	Feralun
Trolley catchers	Ohio Brass, self-oiling
Trolley base	Ohio Brass Form 1
Trolley wheels	Columbia
Trucks	Brill and St. Louis
Ventilators	Railway Utility
Wheels	Standard Steel, 26 in. diameter

of the first cars purchased will start this fall, and at that time the spares will have to be increased to approximately 10 per cent. But even with this, the number of extra equipments required will be reduced from approximately 20 per cent to 10 per cent.

Another saving has resulted from the use of Johnson type J coin boxes, together with solenoid-operated registers. The fare collection and registering equipment was described in ELECTRIC RAILWAY JOURNAL for Oct. 27, 1923, page 747. The increase in passenger receipts with the new type of coin switch over that when using the older type of fare box was found to be approximately 4 per cent. In speaking of the reason for this saving, C. E. Morgan, vice-president and general manager of the railroad, said that he believes it is due largely to the increased opportunity given conductors to inspect individual coins in the fare box. With this type of equipment, the passenger places the coin in a slot and after it is registered it is exposed to the view of the conductor. Since each individual fare is deposited and is brought to view separately, the operator has a better chance to detect fraudulent practices than would be the case with several coins in a heap in the fare box.

At Left—Each Individual Fare Is Deposited and Brought to View Separately. In Center—The Inside Gives a Pleasing, Roomy Impression. At Right—Rear-End Seating Arrangement Provides a Comfortable Nook

The new cars are being painted with the same type of spider-web design on the dashers to distinguish the new cars from the old equipment that was used on the previous lot. Comments received from the public regarding this feature show that it has been of material assistance in advertising that new cars were being placed in service, and that these cars have increased advantages and riding comfort over the older equipment.

MINOR CHANGES IN THE NEW CARS

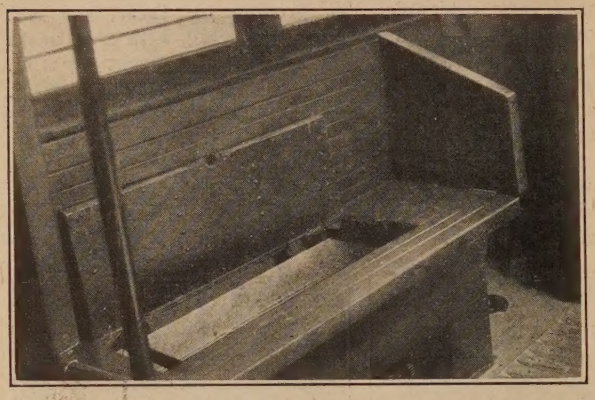
The width of the cars now being delivered has been increased 1 in. over the previous ones. Other dimensions are the same. Particular attention has been given to provide the maximum space possible in the cars. Due to operating clearances, cars in Brooklyn are necessarily limited in width. The new cars, with a width of 8 ft. 4 in., however, are but ½ in. narrower between the glass of the windows than the 5100 series of cars operated by this company, which are 2 in. wider over all. In order to move the window sash out as far as possible, a special construction is used for the side body posts. These consist of 1½-in. x 1½-in. x $\frac{3}{16}$-in. rolled tees which extend from side sill angles to the top rail. A wood filler is placed on the inside of the tee and a formed sheet steel strip on the outside is bent down along the sides of the wood filler, to which it is bolted. The sash fits against these metal strips, which are welded to the window sill in order to keep out water.

Operation of the first order of cars showed that a wider aisle and additional space for standing passengers was very desirable. To provide for these, the last orders of cars have a staggered seating, with cross seats on one side of the car and a longitudinal seat opposite. This gives an aisle width of 3 ft. 6½ in. The seating capacity of 50 passengers remains the same. The arrangement of folding seats for the vestibules and at center doors of cars is the same. The Davis book type of folding seat has proved very satisfactory. It provides a seat length of 4 ft. 7 in. with both end and center supports and does away with the disagreeable feature of having a stanchion in the center of the seat which would limit the number of passengers which could occupy the space. This type of seat also prevents the danger and annoyance from folding supports being placed improperly which might result in the seat falling down while in service.

Some changes have been made in the arrangement of the stanchions and barriers at the center of the car. With the pay-as-you-pass system of fare collection, passengers going from the front or unpaid to the rear or pay section will ordinarily pass to the right of the conductor, while those in the front section who desire to alight will pass to the left. In the original design as installed on the cars, there were four upright stanchions extending from the floor to the roof in line with the aisle side of the cross seats. On the new cars these stanchions have been moved back approximately 10 in. toward the side of the car. The barrier on the left as a passenger goes from the front section to the exit extends out from the vertical stanchion and has a pipe railing at the top. By this arrangement, it is necessary for passengers to pass adjacent to the conductor. At the same time additional room is provided above the passengers' waists. This gives additional space for their elbows and arms, and also improves the inside appearance of the car since there is less obstruction to vision from one end to the other. All pipe

stanchions and railings are of 1-in. wrought-iron pipe. All flanges for stanchions are recessed so that they are flush with the floor. Stanchions are painted green with two coats of Lucas stanchion enamel covered with hard drying varnish. The floor mat at the center of the car also has had additional crosswise grooves added so as to facilitate drainage to the sides.

The window guards consist of six horizontal rods held by supports at each window post. These set into



There Are No Corners or Ledges for Collection of Sand in Sand Box Opening. Electric Heater in Seat Keeps Sand Dry

sockets in retaining castings. In order to prevent rattling and provide a tight fit, the center part of the supporting frame is beveled outward slightly, and a beveled casting on the window post fits tightly against this. Downward movement of the guards forces these two beveled surfaces together and prevents all looseness. The window guards are arranged in five sections for each side, two sections covering three windows each and three sections covering two windows each. They are hinged at the bottom and are arranged so as to drop down for cleaning the windows.

Vestibule Ends Are Demountable

A new feature of these cars is the construction of the ends of the vestibules ahead of the doors as separate units. This is to provide for easy removal and replacement in case of damage from collision in street traffic. Each vestibule has a double hood plate with the lower or sub-hood plate extending between the vestibule corner posts. This is securely bolted to the upper or main

Cabinets Are Provided for Auxiliary Circuit Switches and Fuses and for Door Engines

hood plate with the bolts readily accessible. The vestibule corner posts are made of wood in two pieces, bolted together. The forward part of each corner post and the two center vestibule posts are tenoned into the sub-hood plate only, while the rear parts of the corner posts are tenoned into the main hood plate only. Pocket castings bolted to the crownpiece are provided for the bottoms of all vestibule posts. The entire vestibule front is a separate unit made interchangeable for all cars of the series. Separate units can thus be kept on hand for replacement. The front section of the vestibule can be removed and a new one put in place in less than three hours. To dismount a vestibule, the equipment at the dasher must be disconnected. This includes the controller, brake valve, hand brake, etc. On the outside the dasher sheets and bumper shields must be removed. Removable sheets on the inside give access to the various bolts for disconnecting. In its normal position, the demountable section is supported on spacing blocks. After the bolts are disconnected, these spacing blocks are taken out, allowing the vestibule to drop down ¾ in. This gives clearance so that the section can then be swung outward and removed.

A fireproof compartment constructed of No. 18 gage sheet steel suitably lined with transite is provided at the No. 1 end for the switches and fuses controlling auxiliary circuits. The covers for the compartment are hinged at the top and latched at the bottom with Howard swing sash latches. Openings in the compartment provide for various wiring conduits. All switches are of quick-break blade type and these, together with the fuses, are mounted on a slate base. On the side opposite the switchboard cabinet, and over the entrance doors, is another cabinet for the door engine.

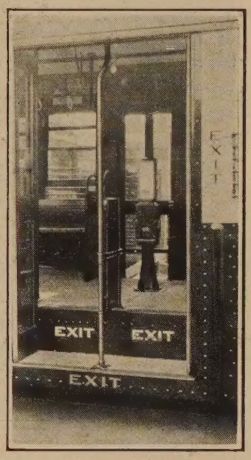
Time Saved by Tables of Destination Signs

Another feature of these cars is a table of numbered destination sign readings for convenience of the operator in turning the Hunter destination sign from one reading to another. The wording of each sign, together with a serial number, is stenciled on the back, so that these can be read conveniently by the operator when he lifts the cover. A table of the sign readings arranged alphabetically with the corresponding sign numbers is placed on glass by the decalcomania process. This table is placed in a metal holder at the back of the sign box. In order to shift a sign from one designation to another, the operator finds the number for the sign designation to which he wishes to turn the sign, then by lifting the cover and observing the number of the sign designation in place, he will know which way to turn the sign and how far in order to reach the required designation. This arrangement saves time and trouble of operators at terminals and is of particular value at points where there is no layover to allow time for it.

A change has also been made in the method of running the car cables and installing car wiring on the latest cars. The main train line cable between controllers on the first cars was installed in a 2-in. conduit running the entire length of the car body. On the new cars a junction box is installed underneath each controller. From this two 2-in. conduits run to the end sill, which is of open construction and serves as a junction box. The junction boxes underneath the controllers have covers at the bottom and front end, and the end sill has a cover for the bottom and the side toward the car body. This permits a straight pull of the cable from the junction box to the end sill and with the arrangement of covers there is ample space for pulling in wires. From the end sill motor cables are run in two 1¼-in. conduits. The wires between controllers and for the resistance leads cross over to the corner of the car through the end sill, go up the corner posts and back of the advertising sign racks to the center doors of the car, where they cross above the headlining. All this wire is run in metal duct. Aluminum junction

boxes are installed at each corner. Two junction boxes are installed at the center, one for the resistor lead splices and one for the main cable leads. The resistor cables are made up at the bench and are installed complete. All junction boxes are of aluminum to reduce weight. By installing the main car cable inside the car, additional space is given underneath for a better arrangement of the equipment installed underneath the car body.

In the new cars the number of sand boxes was reduced



At Left—Placing a Folding Book Type Seat in Position for Passengers. At Right—The Folding Seat Forms a Barrier to Divide Streams of Passengers Coming from Opposite Ends of Car

from four to two and these are installed underneath the longitudinal seat in each vestibule instead of underneath longitudinal seats at each corner of the car body. The boxes are lined with No. 22 gage galvanized iron and the top has a removable screen. Particular attention has been given in the design of the opening underneath the seat so that there are no projecting edges on which sand might lodge, so as to prevent closing down of the seat and loosening of hinges. The seat which forms a cover for the box is supported on two cross irons which have sharp edges and there are no supports at the ends or corners. A 1¼-in. steel discharge pipe which runs to a position 6 in from the rail is provided for each sand box. Particular attention is given to sealing the connection from the sand box to the pipe, so that water cannot enter. An electric heater under the seat with the sand box keeps the sand dry and prevents freezing in winter weather.

A change has been made in the method of attaching the coin box to the fare box stand. With this system of fare collection, the conductor changes his location from one side in the middle of the car to the other when the motorman changes ends. This requires the turning of the coin box 180 deg. Originally, it was necessary to unlock the box in order to turn it. With the new construction the contacts are made automatically so that the box can be rotated. If it is removed, the contacts are forced out of position, which disconnects them from the circuit. Other changes in the new cars include the use of a 14-in. gong, which gives a louder and clearer tone; installation of the heat regulator underneath one of the longitudinal seats instead of overhead on the platform, use of a heavier casting for the emergency drawbar and reinforcing castings where the vestibules join the car body.

The detailed specifications of the new cars are given in the table on page 1004.

Handling Freight on Aroostook Valley Line

New 60-Ton Electric Locomotive Recently Built for This Service Has Interesting Features—Severe Winter Weather Presents an Operating Problem

DURING the year 1923-24 the Aroostook Valley Railroad, Presque Isle, Me., handled 3,746 cars of potatoes, averaging 675 bushels per car. Thus, at 20 lb. per bushel, the average car weight was 20¼ tons. At the same time 900 cars of inbound freight were received and distributed, most of which was fertilizer. The management considers that the road hauls one carload of fertilizer to every ten cars of potatoes. The railroad also handles a considerable amount of other freight, consisting of coal and general merchandise.

Weather conditions during the larger part of the year are very severe in this part of Maine. There is much snow and temperatures ranging between 25 and 35 deg. below zero are not exceptional. In spite of this weather handicap, the railroad maintains excellent service in handling its freight traffic.

Electrified lines of this railroad total about 32 miles. The rolling stock consists of one 40-ton locomotive, one heavy double-truck motor freight car, four double-truck interurban motor passenger cars, one new 60-ton

New 60-Ton Locomotive of the Aroostook Valley Railroad Hauling 30-Car Freight Train

Baldwin-Westinghouse freight locomotive and a number of trail cars, both passenger and freight.

Several interesting features are included in the new locomotive. A central compartment houses the electrical equipment, except the compressors and blowers, which are mounted near the sloping hoods at each end of the cab. Air brake equipment is of the standard 14-EL type, particularly adapted for operating in multiple with standard steam railway equipment. The compressors are of the D-4-P, of 50 cu.ft. capacity.

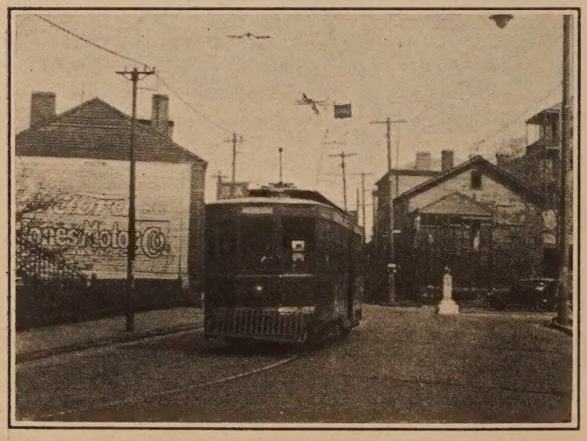
Motors are wound for 1,200 volts per commutator. An 800-cu.ft. blower motor equipped with ball bearings is used to ventilate the main propulsion motors, one of which is mounted on each axle. Air is obtained from the inside of one of the hoods. In this way the maximum protection from snow and dirt is afforded the driving motors. The air is conducted through an air duct formed by closing the space between the two center channels with a piece of iron sheeting and lead directly to each motor through a flexible air connection.

A feature of the electrical equipment is that all auxiliary circuits are fused to a common bus bar. Fuses of the expulsion type are used. A separate auxiliary control cutout switch is mounted adjacent to the auxiliary fuses so that by opening this switch the auxiliary fuse bus bar is dead and fuses may be replaced without danger to the operator.

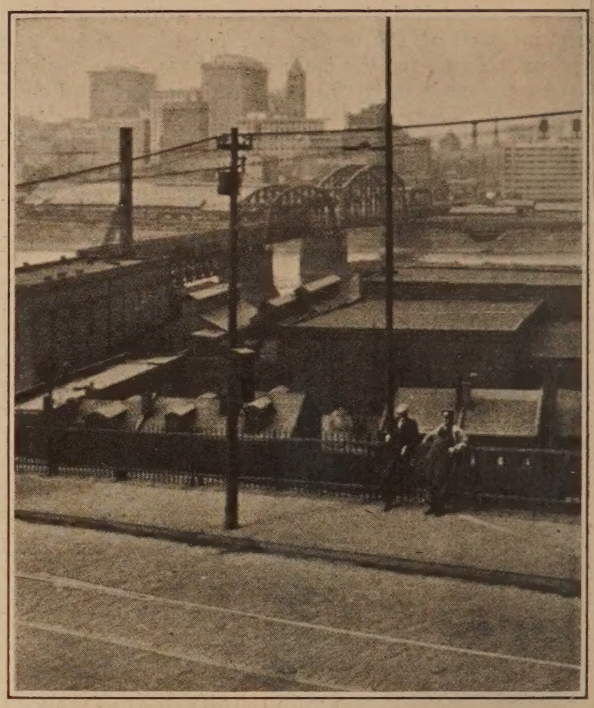
Resistance grids are mounted close to the ceiling directly under ventilators with the other main apparatus below and adjacent thereto. This arrangement, together with solid covers which inclose the greater portion of the control cabinet, allows the head of the grids to set up drafts which ventilate the control compartment. On account of the severe snows encountered, the headlights are mounted on swivel pivots directly under the roof overhang at each end of the cab.

Automatic Derails Protect Grades

RAILWAY operation in Pittsburgh has always been complicated by the existence of many long and steep grades. One of the worst of these grades is on Brownsville Avenue beginning at the south end of the Smithfield Street bridge and rising to the top of the south hills. To protect car operation on this street the Pittsburgh Railways installed a derail switch midway up the hill. Under this arrangement it was necessary for inbound cars coming down hill to stop while the conductor alighted and pulled the derail.



Car Passing Under Contactor of Automatic Derail on Steep Hill in Pittsburgh



Relays for Operating the Automatic Derail Switch Are Located in the Pole Box

Recently, however, two difficulties arose in connection with this operation. In the first place the opening of the Liberty Tunnels, which are reached via Brownsville Avenue, greatly increased the volume of vehicular traffic on that street. At times this was so great that the operation of alighting and pulling the derail was one of considerable danger. The desire of the railway to operate one-man cars on this route at certain times also complicated the situation.

A solution was found in the installation of an automatic derail switch. This is so arranged that passage of a car under the contactor causes a primary relay to close. This in turn actuates a second relay, which, however, is equipped with a slug on the outer end of the armature, causing it to vibrate. The derail remains open until this vibration ceases and the armature comes to rest in a closed position. Ten seconds is the period of time theoretically required, although in actual practice it varies somewhat. This time lag is sufficiently long so that a car going down hill must come almost to a dead stop between the contactor and the derail. Passage of the car under a second contactor opens the relay and the switch.

Installations similar to the one here described have been made by the Pittsburgh Railways in a number of other locations, all of which have operated satisfactorily to insure safe operation on steep grades.

In defining the functions of the "holding companies" in the public utility field, Samuel Insull, president Commonwealth Edison Company, Chicago, said recently that "most of the outstanding developments of the last twelve or fifteen years in the electrical field are due to the so-called holding companies, which have performed prodigies in spite of the handicap of the inept family name." Financially speaking, this type of company is an elaboration of the "investment trust" which was long since standardized in Great Britain.

Electric Railways Keep Pace in Rapidly Growing Texas Cities

Local Street Railway Lines and Interurbans Have Played an Important Part in the Development of Houston, Dallas, San Antonio and Fort Worth —A Spirit of Co-operation Has Been Built Up by Close Attention to Public Demands—Buses Are Operated by Railways in Houston and San Antonio

By Charles Gordon
Western Editor ELECTRIC RAILWAY JOURNAL

Buses and Cars Are Operated at the Same Fare in Houston. Transfers Are Issued Free

IN THE State of Texas one is met on every hand with unmistakable evidence of rapid development and growth. There is a spirit of friendly rivalry between the larger cities and a strong feeling of community consciousness and civic pride has been built up. Among the leaders in these communities transportation is recognized as an all-important factor in civic growth, and consequently the problem of financing extensions of service continually confronts the managements of the properties serving several of the larger cities.

Texas is a "home rule" state. Regulation of utilities is in the hands of local authorities in the various cities, who are directly subject to the opinion of the users of utility service. Under these conditions the railways are in a sense regulated by their own customers, and the problem of winning public favor and confidence is essential to successful operation. This has been accomplished to the extent of building up a generally fair attitude on the part of public officials in the several cities.

The railway managements have accepted their responsibility for rendering a complete transportation service and providing for newly built-up territory. The communities, on their part, have come to learn that unified transportation service under a single management is of utmost importance to healthy and normal civic development. Considerable progress has been made in working out arrangements to prevent the overextension of transportation lines into thinly populated real estate projects. Real estate men are gradually being brought to accept the principle of assuming the cost of transportation extensions into new territory where available traffic will not support the new transportation service.

NEW HOMES REQUIRE TRANSPORTATION

Development of the cities is based on agricultural, industrial and commercial growth throughout the state. Many homes are being erected for workmen or commercial employees. Consequently, rapidly growing residential sections are largely populated by good street car riders. In both Dallas and Fort Worth street cars are demanded in preference to buses, because of the permanence which the laying of rails lends to the element of transportation in a new community. In Houston and San Antonio, however, the bus has been

adopted for serving certain sections. Although some of these lines are in the nature of a preferred or de luxe service, the bus is also being used for the extension of service into new territory in preference to the heavy investment required for electric cars and rail extensions.

Houston is a keen contender for business and industrial leadership of the state. Completion of a ship channel to the Gulf of Mexico has transformed this former inland city into a seaport and has put it into the position of becoming the water gateway into the vast resources of the Lone Star State. Important industries have found ideal conditions for development, and an optimistic view of the city's future importance seems to be well justified.

The Houston Electric Company has been actively identified as a progressive force in the community. After a period of serious jitney competition, the city was finally brought to see that a single transportation agency under responsible management is the only economically sound civic policy. The railway management has shown a sincere desire to extend its service to keep pace with the growth of the city. The bus has been used for this purpose, particularly where a demand for service has developed in newly built-up communities with paved streets where rail construction cost was considered excessive.

Buses Replaced Jitneys

Some of the original bus lines in the city were put in to replace former jitney lines whose removal was made contingent on the institution of such bus service. The Houston Electric Company does not have an exclusive franchise to operate buses, but is dependent on popular acceptance of the principle that all transportation service should be rendered by one management. Due to this combination of conditions, buses at present are operated for the same fare as that charged on the street cars, namely, 7 cents cash and four tickets for a quarter. Transfers between buses and cars are issued free.

An accompanying map shows the complete transportation system, including both car lines and buses. A total of 21 buses are owned. These include seven Yellow Coach Model Z, 29-passenger buses, eleven Fageol buses with 29-passenger steel bodies, built by the American Car Company, and three Reos with nineteen-passenger city type bodies.

The Austin bus line extends southwesterly from the business district through a thickly populated residential section. Operation of this line was started in place of a former jitney route. This is a comparatively short line with heavy traffic. The base headways are eight minutes in the morning and six minutes in the afternoon. During the rush hours, additional service brings the headway down to four minutes. Fageol equipment is operated, and schedule speeds of approximately 10.25 miles per hour are maintained. The bus route parallels the South End car line, which is a single-track line with a large loop at the outer terminus. At some points inbound cars on this loop are approximately five blocks from a built-up residential section of considerable size. For this reason, the demand for bus service was insistent.

Due to the heavy density of traffic and the short route distance on this line, it has shown earnings of $13,000 a year above interest, depreciation and operating charges, even on the low rate of fare that is charged. Other lines in the city that do not have the same traffic characteristics have run up substantial losses. This is true of both the West Webster and the East End lines. In each of these cases the routes are considerably longer and the traffic much lighter than on the Austin line.

Experience with existing bus routes has convinced the Houston Electric Company management that bus service should be essentially a preferred type of service at a substantially higher fare than that charged on street cars. W. E. Wood, manager, is a firm advocate of the principle that all bus operations should be made self-supporting and that a rate of fare should be charged high enough to avoid making street car riders pay for deficits incurred in furnishing bus service to thinly populated districts.

Several interesting plans are being worked out to make specially benefited property carry the cost of service extensions into unprofitable territory. In one case a Reo bus is operated two trips per day to a cotton mill for the special convenience of the employees of this concern. This service is rendered on the basis of a direct charge of 20 cents per mile against the owners of the mill. In another case, a requested extension to a high-grade residential development is being negotiated on the basis of a guarantee of operating expenses by the real estate operator. In the working out of this arrangement the terms of contract and form of bond are being carefully studied. The purpose is to protect the transportation company against discontinuance of the agreement by the real estate operator before the district has been properly built up. Once a line is established, it is assumed that a demand for continuance of service, even at a loss by the transportation company, would be made if such a bond were not put up as a guarantee over a certain period.

In still another case a bus line is being contemplated as a substitute for a section of an existing rail line that must be either torn up or rebuilt. This service will extend to the Harrisburg section, which is about to become a part of the city. It is proposed to furnish an express bus service to this community from the business district, which will be operated at a minimum fare of 10 cents.

Buses in Houston are operated as an integral part of the railway organization. Drivers are selected from among the trainmen and are paid the same rate as one-man car operators, namely, 54 cents per hour. The superintendent of transportation has charge of the operation of buses and the master mechanic has charge of their maintenance.

Building Friendly Public Relations

Frank understanding and a mutual endeavor to play fair in all respects are producing favorable and friendly relations between the company and the representatives of the community. Paid newspaper space is being used to tell the public about the operations of the transportation property. It is believed that a policy of frank co-operation is to the advantage of the company in gaining for it the complete confidence of the community.

Some general idea of the progress which has already been made in this direction is given by remarks made by D. J. Kirk, public utility commissioner of the city, before the recent annual meeting of the Southwestern Public Utility Association, held in Houston in May. He said there that most troubles between the

public and its utilities are attributable to misunderstandings and suspicion. He expressed a firm conviction in favor of unified operation of all transportation facilities in a given community, and also opposed the indirect taxing of car riders through the requirement of paying for street paving out of car fares.

Dallas and Houston Are Rivals

Dallas is also an active and energetic contender for industrial and commercial supremacy. From the standpoint of population, it is generally recognized that the two cities are close contestants for honors.

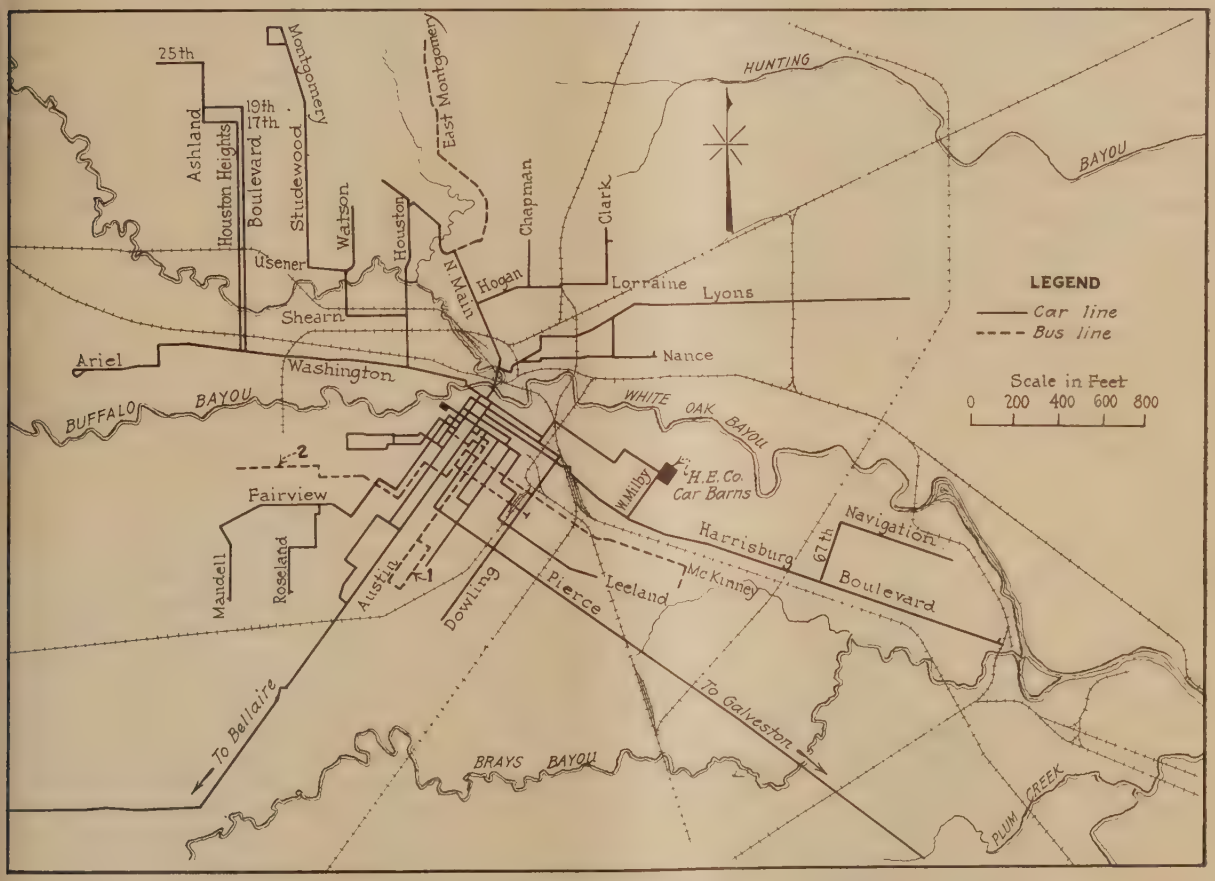
Interurban electric railways have played a large part in the development of Dallas. A modern terminal building and station, owned by the Dallas Railway, serves as the terminus for interurban lines radiating in all directions from the city. To the west, the Northern Texas Traction Company operates to Fort Worth, where connection is made with interurban cars operating to Cleburne. Thirty-minute service is given between the two cities. Local cars and non-stop limited trains are alternated throughout the day. The Texas Electric Railway extends southwest to Waco, southeast to Corsicana and north to Sherman and Denison. Hourly service with alternate limited and local cars to each of these cities is furnished.

Northwest from the city, the Texas Interurban Railway serves Denton. East from Dallas its line reaches Terrell. Hourly service, similar to that given by the other roads, is furnished. A marked distinction exists in the type of equipment operated by the Texas Interurban Railway. That of the other lines out of Dallas is of the heavy, high-floor interurban type, while low-floor, light-weight cars are used for both passenger and express service by the Texas Interurban Railway. The line to Denton is operated for most of the distance over the tracks of the M-K-T steam railroad. A complete description of this novel operation was published in the April 25, 1925, issue of ELECTRIC RAILWAY JOURNAL, page 647.

Automotive Competition Serious

Completion of good highways between some of the principal cities and towns in northern Texas has resulted in serious competition to the interurbans from private automobiles and buses. Texas has no regulatory law covering the operation of buses and until such law is obtained the problem of protecting the interurban investment is serious. The buses themselves are not free from competition. This has resulted in duplication of lines, which has made it extremely difficult for the interurbans to make any traffic interchange arrangements with bus operators, even on routes where such arrangements would build traffic for both by making the buses from outlying towns feeders to the interurbans.

Between Dallas and Fort Worth an independent bus line, operating Fageol intercity equipment, is making a serious fight for patronage with the Northern Texas Traction Company. The latter has been able to hold a



A Combination of Rail and Bus Lines Furnishes Houston with Complete Transportation Service Under a Single Management

A New Paint Shop, 50 Ft. x 160 Ft., Has Been Built in Fort Worth. Brightly Painted Cars Are Considered a Valuable Aid in Merchandising Service

substantial part of the traffic by the institution of non-stop express service with its new "Crimson Limited" trains. Despite this superior service, however, it is estimated that buses are taking nearly 20 per cent of the traffic between the cities.

The Texas Electric Railway has in the past been a profitable enterprise and has furnished a high-grade service to the communities it serves. This company also operates local street cars in some of the smaller towns on its lines. Buses and automobiles have made serious inroads on receipts, in spite of determined efforts to improve and sell the railway service. Not only is direct advertising used to build railway business, but advertising souvenirs are distributed over a wide territory contributory to the lines. In some of the smaller towns, where track reconstruction programs have become necessary, plans are being made to substitute buses for the local rail service.

Rail Lines Have Been Extended into the Rapidly Growing Residential Sections of Dallas. In Some Cases Real Estate Developers Have Assumed the Cost of New Railway Construction

Dallas Attacks Congestion Problems

The Dallas Railway operates all of the street cars in the city. Both one-man and two-man cars are used. Double-truck one-man cars equipped with automatic treadle controlled rear exit doors are operated through the congested business district without difficulty. Street fare collectors at points of heavy traffic assist materially in expediting the loading of cars during the rush hours.

Commerce, Main and Elm Streets constitute the main arteries through the business district. Many lines converge on these streets and during the rush hours the traffic is very heavy. Narrow downtown streets add to the problem, but unusually rigid parking restrictions help to relieve the situation materially. Even taxicabs are prohibited from parking on the streets and taxicab companies are required to maintain downtown garages instead of using the already congested streets as cab stands. Synchronized traffic control signal systems are installed in the business districts of Dallas, as well as in Houston, San Antonio and Fort Worth. In all these cities pedestrian traffic moves on signal with vehicles. This regulation is closely enforced, and vehicular traffic is thus enabled to move rapidly at intersecting streets.

Residential sub-divisions in Dallas are being developed rapidly. These are striking evidence of the growth in population. As a result, however, the problem of making rail extensions is an acute one. In addition to new lines the rapidly growing demand for additional car service has required the company to carry on a steady program of double tracking existing single-track lines.

Rail Lines Preferred to Buses

Extensions are being made by rail, rather than by bus. No buses are operated in the city and the demand for them has not been pressing. Narrow streets and congested traffic have been limiting factors of importance. Another has been that the sub-dividers of property and the new residents of built-up districts have insisted on car service rather than buses because of the permanence that is given to the transportation service, once rails are laid in the streets. In some locations transportation extensions have been requested by real estate operators before population would warrant the expenditure for laying rail. Under such conditions, the cost of construction is being met by the real estate development companies. Several extensions of this type have been put in recently.

A broad policy of cultivating friendly public relations is maintained by the company. No small part of this is the work of the transportation department among its employees who come in direct contact with the public. New men are not only carefully selected but, together with older employees, they are carefully supervised and instructed regarding their relations with the company's customers. New employees are recruited to a large extent from the rural communities of the state and consist of young men who have come to Dallas seeking employment. These men have been found to make the finest type of trainmen after having been properly instructed in their duties.

Contact with the local newspapers is maintained

through the publicity department of the company. One example of the favorable results that are obtained by co-operation with the press of the city is the method followed in the case of accidents. For some time it has been the practice to furnish the newspapers with a full report of every important accident that occurs, regardless of whether or not the company was at fault. No attempt is made to color such stories in favor of the company. All the facts are given just as they occurred and as accurately as the company is able to determine them. So successful has this attitude of frankness been that the press of the city has come to rely on these reports and has largely discontinued the practice of sending reporters out to cover street railway accidents.

Fort Worth Merchandises Service

Fort Worth, like the other large cities of the state, is growing rapidly. The city lines are operated by the Northern Texas Traction Company along with the interurbans to Dallas and Cleburne. Buses are not operated by the railway in Fort Worth and necessary extensions of service have up to the present time been made by rail lines.

Since winning the 1924 Coffin prize the company has by no means let down in its efforts to improve its service and then merchandise it by modern business building methods. Staff meetings are devoted largely to discussions of business building ideas. Some of the sales methods used will be described in a special article to be published in a subsequent issue.

The Fort Worth management is a firm believer in the value of paint on its cars as a help in selling its service. A new paint shop recently has been completed. This is a concrete structure which measures 50 ft. x 160 ft. It has three tracks, each 130 ft. long, for the storage of cars to be painted. At one end a balcony 20 ft. x 50 ft. covers a paint storage vault and men's wash room below. This balcony is used for trimming, sign and sash work.

Progressive Ideas in San Antonio

San Antonio, the oldest city in Texas, is also one of the oldest in the country. Its railway, however, is progressive and well abreast of the times. A policy of retiring older equipment, to be used only in emergency service, has been in force for some years and has resulted in the gradual replacement of old and heavy equipment with modern light-weight cars. As another phase of this policy, the bus is being used to supplement the rail system wherever it provides improved service or promises reduced operating cost.

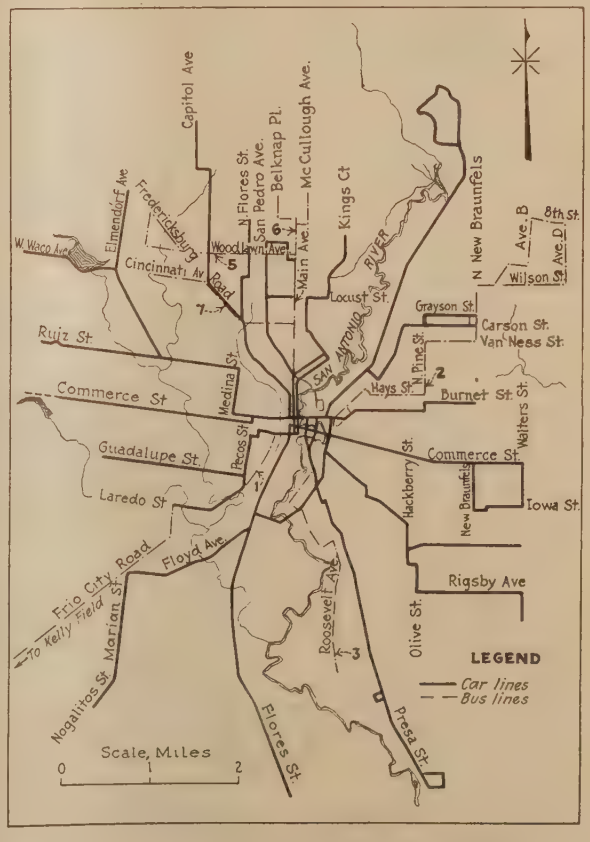
A total of 120 street cars are now operated. These include 64 double-truck two-man cars and 66 single-truck one-man cars. Bus equipment consists of seven 29-passenger Fageols, one 29-passenger Yellow Model Z and eleven 21-passenger Reos.

Car and bus routes in the city are shown on an accompanying map. Bus route 1 on the map was put in operation Dec. 1, 1923, to replace a single-track car line on which expensive reconstruction work would have been needed to keep it in service. This line serves South San Antonio and Kelly Field, an important army flying field. One Fageol bus is operated on an hourly headway during the base period and a second bus of the same type is put on during the morning and evening to reduce the headway to a half hour. Although this line is unprofitable, the use of buses materially reduces the losses over what they were when cars were used.

Small Wayside Stations, Between Dallas and Fort Worth, Are Made Attractive

An old rail, sunk flush with the ground in front of these stations, is painted white to mark the clearance limit of passing trains. A safety message appears on this marker. Note the fence between the tracks.

Line 2 on the map runs between the Alamo Plaza and Fort Sam Houston. This was put into service in September, 1923. Two Fageol buses in all day service furnish a twenty-minute headway, and two tripper buses during the morning and evening reduce the headway to ten minutes. This line gives service to Fort Sam Houston in addition to an existing car line which also reaches the fort. The fare on the cars is 6 cents, while on the buses throughout the city the fare is 10 cents, with a 4-cent charge for transfers from cars



Buses Supplement the Rail Lines in San Antonio. Most of the Bus Lines Terminate in Small City Parks Near the Business District

to buses. Within the fort the buses carry local passengers for 5 cents.

The other lines shown on the map were started more recently. No. 3 was originally a shuttle line at the end of the existing car line. Under these conditions the riding was very small and the operation was entirely unprofitable. Later the bus route was established from the business district so as to interfere as little as possible with the rail line and at the same time reach a district near the end that was previously inaccessible to the cars. Under these conditions the operation has been much more successful than as a shuttle feeder. One Reo bus furnishes 30-minute service over this line.

Practically all of the bus lines that radiate out into various sections of the city terminate in small public parks near the business district. At these points bus waiting stations have been established. Time clocks have been erected by the company for the convenience of passengers and employees and the city has provided benches for their comfort. A bulletin board carries a time-table so that the time of departure of the various lines can be conveniently determined. One of these park waiting stations, which is the terminus for several important lines, is directly across the street from the St. Anthony Hotel.

Dallas Is the Center of an Extensive System of Interurban Lines Which Have Played an Important Part in the Development of the City

Line 5 was put in operation in November, 1924. Two Reo buses furnish twenty-minute service on each leg of the route. Line 6 has been in operation since May of the same year. This is also in two divisions and three Reo buses furnish the required service. In this case one bus is assigned to each division, while the third alternates on each trip. One Reo bus is also operated on line 7, making the headway 30 minutes. As the buses on lines 5, 6 and 7 converge on a common route as they approach the business district, the schedules of the various routes are fitted into each other and the headway is gradually decreased.

As in the case of Houston, the bus and rail service are handled together by the same operating organization. Bus drivers are selected from the train service and are paid the same rate as one-man car operators. To keep men from switching back and forth between cars and buses, however, the seniority lists on buses are open only once a year, so that a man who has picked a run back on the cars after once having been on the buses does not have the opportunity of changing again for a year.

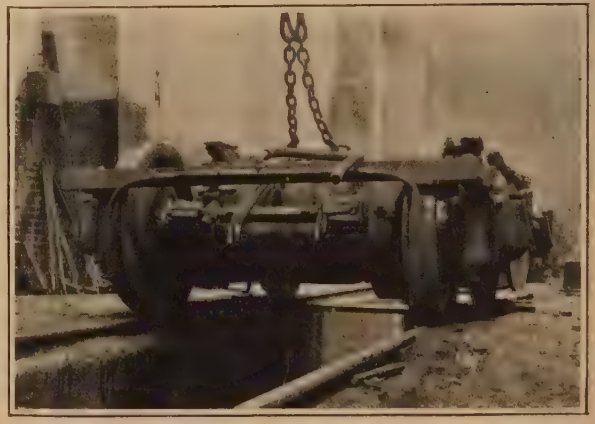
There is one distinct difference between the views of the Houston and San Antonio managements on the subject of bus taxation. In San Antonio the bus is taxed so as to put it on a comparable basis with street cars so far as tax burdens are concerned. A special license fee of $5 per seat is charged by the city for paving maintenance. This is estimated to be equivalent to the cost to the company per car seat operated for maintaining the paving between its tracks on car line streets. In addition, a $200 state tax, together with federal and special taxes, makes the total annual cost per bus approximately $600.

In Houston the management has contended for moderate taxes on the bus. It has been held that the car rider is now taxed unjustly for the cost of maintaining paving used by other vehicles and should be relieved of this burden as rapidly as possible. For this reason it is also held that such relief for the car rider would then put the bus and car on a comparable basis and would be a much fairer method of equalizing matters than to load the bus down with extra burdens just because the cars are already in this predicament.

San Antonio has been the more fortunate in its experience with buses in that a minimum fare of 10 cents is charged and a transfer charge is also made. Houston has demonstrated by experience that its fare of four tickets for a quarter with free transfers will not support the bus-operating costs except on very short lines of heavy traffic. There is prospect in Houston of converting the people of the city to the idea of making bus operation self-supporting. In both cities the managements look on bus service as a preferred type of service which justifies a rate of fare high enough for its proper operation.

Sand Outlets Attached to Trucks on Interurban Cars

THE Washington, Baltimore & Annapolis Electric Railroad has adopted the practice of attaching sand outlets directly to the tracks of its interurban cars. This insures greater reliability in sanding track directly in front of the wheels, particularly on curves where the car body and the trucks are out of line.



Sanding Tracks on Curves Is Facilitated by Having the Pipes Attached to the Car Truck in This Manner

A 1-in. pipe bent to the shape of an inverted letter U is used. At the ends slightly larger pieces are attached to distribute the sand over the railhead. From the center of the horizontal section a tap is taken off through a rubber hose to the sand box. One sand box is located at each end of the car. Compressed air is used to force it through the pipe on to the track.

At Left, a Short Canvas Awning and Tail Sign Give an Observation Car Effect to the Rear End of the Train. At Right, Crimson and White Paint Are Combined to Good Effect in Improving the Appearance of This Interurban Equipment

"Crimson Limited" Gives Attractive Interurban Service

Northern Texas Traction Company Improves Cars for Fort Worth-Dallas Non-Stop Service with a Special View to Merchandising—Combination of Colors Used to Give Streamline Effect

NON-STOP limited service between Fort Worth and Dallas, Tex., is given hourly by the new "Crimson Limited" trains of the Northern Texas Traction Company, recently installed. These trains are the result of the company's policy of building riders by combining three factors in its equipment; namely, an appearance which suggests speed and creates a desire to ride, fast service and comfortable seating.

Paint has been used to good effect in changing and improving the appearance of the cars, which had been in service a number of years and which in many respects are similar to the type usually operated on other high-grade interurban properties. This has been done by adopting a brilliant crimson for the letterboard and side panels, combined with white for the posts and drip rail. These bands of sharply contrasting colors tend to give the cars an elongated appearance by producing a streamline effect. In two-car trains, consisting of a motor and trailer, the effect is even more pronounced.

At the rear end of the trailer, a short awning adds an observation car appearance. An illuminated tail sign helps to carry out this idea. Seats of parlor-car type have been installed in the rear car. This is used as a club car and no extra charge is made for its use. It is designed primarily to appeal to the business man traveling between the two cities and to offer him in comfort a service which will induce him to make the trip by electric railway instead of by automobile.

The Trail Car Is Equipped as a Club Car for the Convenience of Business Men Using the Service

The front car is entirely equipped with cross-seats. A smoking compartment of the type usually found in interurban cars is provided at the front end of this car. All cross-seats in the main passenger compartment have linen back covers similar to those used by steam roads on chair cars. These covers are visible from the street, and help to carry out the impression which is given by the rest of the train — that of first-class service.

Two-car trains of this type are operated on hourly headway throughout the day. A local service is also given at hourly intervals. This is alternated with the limiteds so that there is a train leaving the terminals at each end every half hour.

The "Crimson Limited" service has a distinct merchandising value, obtained

This Attractive Exhibit Created a Great Deal of Comment at a Recent State Agricultural Exhibition

by comparatively small expenditure for changes to the equipment. The new name is being capitalized in many ways for the purpose of building traffic. One good example is the exhibit shown in an accompanying illustration, which was recently displayed at the Texas Fat Stock Show. In this, a full-sized model of the front end of one of the new trains was set up in a canvas drop so that a realistic effect was produced. In the foreground, a miniature model of the train was electrically operated on a circular track. Carefully worded signs were placed about in this setting to call attention to interesting things concerning the company's operations.

Many other forms of publicity used by the company are being employed to advertise the service of the new "Crimson Limited." As part of this program an active campaign of personal solicitation is under way to call to the business man's attention the advantage of using this service.

Experience with Surface-Hardened Rail in Toronto

THREE years experience with surface-hardened rail treated by the *in situ* process in Toronto has shown a number of interesting results, but in the opinion of the management of the Toronto Transportation Commission its success or failure has not been demonstrated conclusively. In favor of the process, it has been found that the rate of wear on untreated rail is from two to 2½ times as fast as on treated rail. This is about the same as the experience of a number of British tramways. Moreover, it appears that treatment by the *in situ* process has lessened the recurrence of rail corrugation. On the other hand, serious difficulty has been experienced with scalings.

In 1922 this treatment was applied with a high-pressure blowpipe to sections of track on Danforth Avenue, College, Yonge and Queen Streets. The following year it was applied with medium and low-pressure blowpipes to sections of track on Bay Street and on Lake Shore Road. Scalings appeared in the spring of 1923 on Danforth Avenue, College and Yonge Streets. A year later additional scalings occurred on Danforth Avenue. Examination of these sections early in the spring of the present year showed a number of additional defects on Danforth Avenue, but no change in the other treated sections.

Scalings on track in Danforth Avenue are shown in an accompanying illustration. These were so serious that it was not considered economical to make repairs by welding. The outer rail has therefore been replaced. An interesting fact in this connection is that these scalings have all occurred on the outer rail of double-track construction, the devil-strip rail not being affected except in so far as evenness has developed on account of defects in the outer rail. As yet, no defects have occurred in the sections treated in 1923 with a low-pressure blowpipe.

The following points have been noted by the management, but no adequate explanation of them has yet been found: (1) That practically all defects have occurred on the curb side rail; (2) that practically all scalings have occurred during the colder months; (3) that by far the greatest number of defects have occurred on 90-lb. rail which had been in service about nine years; (4) that practically all defects have occurred where the treatment was made with a high-pressure blowpipe; (5) that on Danforth Avenue the thin treated area along the top of the rail near the gage line has become roughened, though it can hardly be classed as scalings.

Scaling Has Occurred in Toronto on Surface-Hardened Rail Treated by the In Situ Process

Association News & Discussions

Electrification Considered by N.E.L.A.

United States Installations Small, Although Comprising 25 per Cent of World's Total—Standardization of System Considered Essential—Electric Railway Men Among New Officers of the Association

STEAM railroad electrification was the subject that predominated at the concluding session of the National Electric Light Association convention, held on June 19 at San Francisco. In its report the association committee on the electrification of steam railroads told of what had already been accomplished in this country and abroad and what was under contemplation in the United States.

Speaking on the subject "Electrification of Transportation," Paul S. Clapp of the United States Department of Commerce outlined the advantages of railroad electrification as well as the practical difficulties under which the railroads would eventually change their motive power from steam to electricity.

"The movement of electrification will be hastened by action in at least two major directions," said Mr. Clapp. "First, by the further development of interconnected central station systems as a source of power supply; second, by the adoption of certain standards which will enable us to develop a unified transportation system and simplify the equipment.

"Interconnected systems can rightfully be considered as more than a substitute for electric power plants which the railroads would otherwise be required to build. They are themselves an impelling reason for electrification. No means has yet been devised by man for more complete utilization of natural resources—fuel and water—than these interconnected systems. The huge central stations made up of large efficient units operated under closest and constant supervision burn coal with maximum results. No more efficient units of such size for conversion of fuel into energy have ever been built. They are able to accumulate large fuel reserves at advantageous times. They can use lower grades of fuel than are possible in locomotives. Such plants can be advantageously located for coal and water supply. Through interconnection large water powers can be developed and more widely distributed. Secondary water power which arises from seasonal flow of streams is utilized in larger quantities.

"All of this results in more economical production and distribution of power. It insures the continued presence of a reliable and adequate power supply, such as is absolutely essential for electrification, and makes this power available at points wherever it may be needed. It enables us to apply water power effectively to transportation. Security of power supply against interruption is safeguarded, since the source of energy is not limited to a single station. Fluctuations in power demand with variations in traffic are more readily absorbed. Additional power required for increase in traffic or extensions will be available without new investment of capital by the railroads."

Uniform plans for electrification, the speaker declared, are an essential if we are to develop a co-ordinated national transportation system. A patchwork of railroad mileages with a variety of electrical characteristics spells inefficient operation, lacks flexibility and is wrong from the standpoint of national defense.

Committee Emphasizes Need for Standardization

The committee on the electrification of steam railroads (Frank R. Coates chairman) quoted in its report the statement made before the A.I.E.E. on May 5, 1925, by the Secretary of Commerce, reviewed what has been accomplished in steam road electrification in this country and the work contemplated, and gave an outline of what has been accomplished abroad. In the statement quoted, Secretary Hoover emphasized particularly the need for standardization both in railroad and power company generating and transmitting equipment in order to prevent waste and facilitate the development of a co-ordinated electrified transportation system. In reviewing past electrification the report said that all of these installations have been superior to the steam service replaced. This has been particularly true in respect to availability for service, flexibility in operation, dependability and economy.

SUMMARY OF ELECTRIFICATION, ALL FOREIGN COUNTRIES

Country	Route Miles	No. Locomotives	Total Tons
Norway	125	43	3,064
Sweden	744	115	11,406
England	28	33	2,328
Germany	635	312	32,515
Austria	543	85	5,107
Switzerland	636	224	21,259
Italy	563	526	40,624
France	659	349	27,618
Spain	80	22	1,595
Canada	38	17	1,283
Mexico	30	10	1,540
Chile	148	45	4,402
Brazil	27	25	2,325
Argentina	...	2	147
Australia	..	2	100
New Zealand	8	5	268
South Africa	171	78	5,820
Japan	48	56	4,064
Java	31	6	420
Total	4,504	1,955	165,894

Plans Going Forward on Several Railroads

The electrification plans which are now part of construction programs concern the systems of the New York, New Haven & Hartford Railroad Company, Norfolk & Western Railway Company, Illinois Central Railroad Company and Virginian Railway Company.

The first two companies have parts of their lines already electrified, the New York, New Haven & Hartford Railroad Company having completed virtually 100 per cent electrification between New York and New Haven. The Illinois Central has already started electrification of its suburban lines, power to be supplied by the Commonwealth Edison Company, and the Virginian Railway Company is completing construction on a part of its system with heavy grades, particularly to handle heavy coal trains. The Pennsylvania Railroad is carrying out extensive tests of equipment in preparation for electrifying its main line between New York and Washington and additional Philadelphia suburban lines. The Great Northern also is making extensions to its electrified system, and railroads having tracks within the New York City limits are making plans for complete electrification in accordance with recent legislation.

In foreign countries electrification has made greater progress in the past few years than in this country, this progress being largely due to a desire to use hydro-electric power and conserve fuel. The table gives a brief

COMING MEETINGS OF *Electric Railway and Allied Associations*

July 17-18—Mid-West Claim Agents' Association, Hotel Jefferson, St. Louis, Missouri.

July 22-25—Pacific Claim Agents' Association, Hotel Biltmore, Los Angeles, Cal.

July 24-25—Central Electric Railway Accountants' Association, Hotel Waldorf, Toledo, Ohio.

August 12—Metropolitan Section A.E.R.A., Summer Outing at Pelham Bay Park.

August 13-14—Wisconsin Utilities Association, Hotel Wausau, Wausau, Wis.

August 27-28—Iowa Electric Railway Association, Operators' Section, Hanford Hotel, Mason City, Iowa.

Sept. 10—Central Electric Railway Master Mechanics Association, Grand Hotel, Anderson, Ind.

Oct. 5-9—American Electric Railway Association, annual convention and exhibits, Young's Million Dollar Pier, Atlantic City, N. J.

summary of progress in electrification abroad.

The following officers were nominated and elected for the ensuing year:

President, J. E. Davidson, Nebraska Power Company, Omaha, Neb. Vice-president, R. F. Pack, Northern States Power Company, Minneapolis, Minn.; H. T. Sands, Charles H. Tenney & Company, Boston, Mass.; P. S. Arkwright, Georgia Railway & Power Company, Atlanta, Ga., and J. B. Miller, Southern California Edison Company, Los Angeles. Treasurer, W. A. Jones, H. L. Doherty & Company, New York. The members at large comprise Franklin T. Griffith, Portland, Ore., ex officio; H. C. Abell, New York; H. M. Edwards, New York; Edwin Gruhl, New York; E. W. Lloyd, Chicago; I. E. Moultrop, Boston, and Harry Reid, Indianapolis.

The electrical manufacturers' representatives are E. M. Herr, Westinghouse Electric & Manufacturing Company; Gerard Swope, General Electric Company, and W. A. Layman, Wagner Electric Corporation. The national section chairmen will be appointed by President-elect Davidson after July.

Wisconsin Meeting in August

THE Railway Section of the Wisconsin Utilities Association will hold its annual summer meeting on Aug. 13 and 14 in the new Hotel Wausau at Wausau, Wis. The convention will begin at noon on Thursday with a "Get-Acquainted Luncheon" at the carhouse of the Wisconsin Valley Electric Company. There will be songs and rollcall stunts. The general topic for the afternoon is "Shop Practice." A movie reel on the manufacture of cars will be a special feature.

An informal dinner followed by dancing will be held on Thursday evening at the Wisconsin Valley Electric Company Park at Rothschild, overlooking the Wisconsin River.

Several subjects of interest will be presented and discussed on Friday morning in the meeting room of the Hotel Wausau. A special luncheon for men and women will be served at the hotel at 1 o'clock. At 2:15 a mountain climb will be conducted up Rib Mountain, the highest elevation in Wisconsin. Saturday will be devoted to fishing, golf, and sightseeing trips.

Public Utility Storekeeping*

By K. C. Campbell
General Storekeeper Detroit Edison Company

PROVIDING materials and supplies for the various departments requiring them is a storekeeper's first and most obvious duty. He is expected to meet any demands within reason on the one hand and not allow his stock to reach an unreasonable figure on the other hand, which may cause him to be criticised by the financial executive of the company. It should be realized that in the public utility line it is essential that the stores department be so organized that sudden demands for material may be met. Company policy may cause a complete rearrangement of plans without previous notice and the stores department, together with the purchasing department, must meet this condition without wasting time questioning why more notice was not given.

From the purchasing agent's viewpoint there is a tendency, well repressed perhaps, but existing nevertheless, to make a good showing by purchasing occasionally, for the sake of a bargain, material which either may not be needed at the time or is not needed in such large quantities. To buy advantageously is good purchasing, but to have on hand an excessive stock is poor storekeeping. To keep these two conditions in balance is good management on the part of everybody concerned. In my mind if both the purchasing agent and the storekeeper are men of the right caliber there will be no difference of opinion in such matters if each proposition is weighed strictly on its merits from a broad company standpoint.

One thing which I would like to emphasize is the advisability of centralizing all stores under one head. Storekeeping is a line of work by itself and to attempt to consider it as a side line is a mistake. If various departments are allowed to procure and keep their own separate stocks the result will be costly for the company. Not only will the turnover of the aggregate stocks be poor and the investment high but material will become obsolete and useless. It is much better by far to intrust all matters connected with stores to one man and allow him to develop a suitable organization.

In public utility companies most of the departments have their duties pretty well defined and the executives can easily gage whether they are performing such duties satisfactorily. In many cases, however, a storekeeper will operate for some time on what he considers a satisfactory basis and suddenly be called to task by the management for having what it considers too high a stock and a poor turnover.

This state of affairs shows a lack of understanding between the storekeeper and the executives on matters about which there should be no element of doubt. The executives should declare themselves by stating precisely what they expect in regard to turnover and money invested. The storekeeper should know exactly what his limits are and should be able at any time to know from his own records and reports whether he is conforming to standards set by the executives.

This standard should be a stock budget, one simple form of which is a budget of stock limits. Through this, executive approval can be set on a certain running investment in stock and they can control it closely by requiring all additions to be submitted for approval. The executives can do their part by advising the stores department as soon as new projects are decided upon and when any changes in work in progress are made.

A stock budget is particularly valuable in the case of spare parts, as it can be seen that the ordinary plan of replenishing stock according to demand and turnover cannot be applied in this case. Every public utility company should make a careful study of the question of spare parts and after weighing the relative importance of the various kinds of apparatus and its liability of failure it should invest in spare parts accordingly. It should not be necessary to emphasize that the storekeeper should co-operate with the company engineers by having this stock in the right place and ready for instant use in case of emergency and also by seeing that it is promptly replaced.

Duties of Control Group

One branch of the work in our own company may be of interest to you. This is a so-called control group, operating within the stores department, whose duty, as its name indicates, is to control the investment in stock. This group studies the turnover of each and every item, approves the locations at which they are carried and approves all purchases and transfers. All dealings with other departments on stock matters, including keeping in touch with jobs in the field, are carried on by this group. This field work is necessary on the larger projects to make intelligent estimating possible and is of great help in providing material at the right time. The control group makes intensive studies of items or groups of items which become "dead" or on which the turnover has become poor. As a result of these studies appropriate action is taken. By putting this responsibility on a separate group, we have attained more efficiency than by having it scattered. We have not lessened in any way the individual responsibilities of the warehouse foremen and others having to do with the various phases of storekeeping, but on the contrary through this control group we have a more thorough check on them than we did before.

The control group makes up each month for the financial executives of the company a six months' forecast of stock to be received and used and also a forecast of stock balances in the various classes. These estimates are based on the latest and most authentic information which can be obtained from various sources on future company plans as well as work in progress. They are necessarily subject to revision when plans are changed and are of considerable assistance to the executives in providing money and for the store department in providing material. The estimates enable the control group to live within the limits of the stock budget and where necessary furnish the information to back up requests for additions to the stock budget.

It is presumed that all public utilities have a salvage department, even if in some cases it is not known by that name. Salvage work needs co-operation on the part of each department from which the salvage originates, the storekeeper who handles and stores it and the purchasing agent who sells the residue which is not used up again on company work. In the first place the salvage man should have advance notification of when property is to be re-

*Abstract of paper read at the annual meeting of the National Association of Purchasing Agents, Milwaukee, May 25-28, 1925.

moved from the system. I am not referring to small items, including scrap of all kinds, which are constantly coming in and which are handled through standard departmental routine, but to the items of machinery and equipment which need special action.

There should be a salvage man in the purchasing or stores organization whose prime duty it is to handle salvage from the time it is to be removed from the system until it is ready to be sold by the purchasing agent. He should act as a go-between for all departments concerned and should have available at call the services of the experts in all departments who are qualified to decide on such points as possible further use of equipment, etc.

Standardization of stock is a subject which has attracted a good deal of interest among the storekeepers and purchasing agents of our industry. Several large companies, including ourselves, have gone into this matter very thoroughly and have made up stock catalogs for distribution among the various departments. The stock catalog is revised as often as necessary, and by following it both the purchasing agent and the storekeeper may be sure that no items of stock are being purchased unless they have been properly approved as being standard. The storekeeper may also guard against accepting into his stock any nonstandard items removed from the system.

National Motor Bus Association Organized in Chicago

DELEGATES representing state associations or motor bus interests in 21 states scattered throughout the country formed a national motor bus association at a meeting held in Chicago on June 16 and 17. Approximately 100 bus operators and others interested in the industry attended this organization meeting. Delegates representing state associations in Massachusetts, Virginia, Ohio, Michigan, California, Washington, Kentucky, Oklahoma, Idaho, North Carolina and New York, together with operators from many other states and manufacturers' representatives, laid the groundwork for a national association.

This meeting is the outcome of a preliminary conference of bus men from ten states, held in Washington, D. C., last month. At that time an organization committee was appointed to formulate preliminary plans. This committee recommended the organization of a national motor bus association under the control of a board of directors and advocated affiliation with the American Automobile Association upon certain conditions laid down in a set of resolutions.

Ernest N. Smith, manager American Automobile Association, addressed the assembled bus men, and outlined briefly the plan of the A. A. A. for broadening its activities by setting up both a motor bus and truck division. He objected to the terms of the resolution prepared by the special organization committee. Action on the committee report had been postponed pending Mr. Smith's arrival. After he had spoken the bus men voted to proceed with the organization of a national association along the lines proposed, but to leave the details of negotiations for affiliation with the A. A. A. to their new board of directors. Thus the new organization was definitely formed, and although it will endeavor to work out an arrangement for affiliation, it was the sense of the meeting that the bus men would proceed to perfect their own organization, even if an affiliation with the A. A. A. did not prove possible.

A constitution was prepared for the new association, and officers were elected for the ensuing year. The plan of organization is built around the state associations. Each existing state organization is to be invited to join the new national body, and the bus men in states which do not have state associations will be urged to organize and become members of the new national association. Membership will be on the basis of the number of buses operated. The dues are to be fixed later by the board of directors.

The various states in the country are grouped into zones, dividing the country up into seven such districts. One representative from each district is to sit on the executive committee, so that representation will be given to local interests in various parts of the country.

Officers and members of the executive committee elected for the ensuing year were as follows: President, R. W. Sanborn, Cleveland, Ohio; vice-president, William T. Crawford, Portland, Ore.; treasurer, R. L. May, Washington, D. C.; executive committee, District 1, R. M. Sparks, Boston, Mass.; District 2, Dr. McMains, Pennsylvania; District 3, S. A. Markel, Richmond, Va.; District 4, G. P. McCallum, Detroit, Mich.; District 6, Ward Faulkner, Muskogee, Okla.; District 7, Thomas Morgan, Oakland, Cal. The election of a director for District 5 was left with the remainder of the new board.

Legislative resolutions adopted by the meeting were as follows:

Resolved, That Congress should enact legislation giving the Interstate Commerce Commission the power to grant or refuse certificates of public convenience and necessity to motor carriers engaged in interstate commerce. In view of the fact that the Interstate Commerce Commission is now overburdened with work and because of the fact that states through which such motor vehicle lines operate are primarily interested in such operations, the authority of the Interstate Commerce Commission should be limited to the granting or refusal of certificates.

Certificates should be granted as a matter of form in all cases in which the application for a certificate is accompanied by certificates from the state public utilities commissions of the various states through which the motor vehicle line is to operate, certifying that such lines will serve the public convenience and necessity. (The term state public utilities commission comprehends state authorities regulating public utilities regardless of by what name called. In states where there is no public utility regulation of motor vehicle common carriers the state highway commissioner may issue such certificate.)

In cases where such certificates from state public utilities commissions cannot be obtained by the applicant the Interstate Commerce Commission shall grant a hearing on the application for a certificate in order to determine whether such operation is a matter of public convenience and necessity. In determining that fact the commission shall take into consideration existing motor transportation facilities. In all other questions involving certificates the Interstate Commerce Commission shall act as an arbiter in determining differences of opinion between the public utilities of the state through which such lines operate. All other regulation of operation of interstate motor vehicle common carriers shall be exercised by the state public utilities commissions of the states in which the operation is carried on.

Resolved, That a respectful request be made to the Honorable Secretary of the Treasury to include in his tax reduction recommendations to the 69th Congress the abolishment of all federal motor vehicle excise taxes.

Resolved, further, That a like request be made to the proper committee in the House of Representatives and the Senate of the United States Congress.

Resolved, further, That every state motor bus association be urged to take similar action and solicit every individual bus operator to interest himself in an effort to abolish this unnecessary burden by a direct appeal to the Congressmen from his district and the Senators from his state.

In view of the transcendent importance of the subject of interstate regulations, your committee on resolutions respectfully recommends that a special committee of three be appointed to examine the various legal questions involved and to represent this association in an effort to harmonize and compromise any differences that may arise between organizations interested in interstate regulations and to confer with the National Association of Public Utility and Road Commissioners, the Interstate Commerce Commission, the Bureau of Good Roads, etc., and from time to time to report progress and make recommendations to the executive committee of this association.

Engineering Education Under Investigation

ELECTRIC railway managers and many others in their organizations are vitally concerned with the results of technical education. Much important material was presented at the 33d annual convention of the Society for the Promotion of Engineering Education held at Union College, Schenectady, N. Y., June 16 to 20, 1925. Outstanding in importance was the preliminary report of the board of investigation and co-ordination of the society, whose work to the extent of $108,000 expenditure is being financed by the Carnegie Corporation. The board has already found, from an extensive canvass, that entering students are not well prepared for technical training, particularly in mathematics and English; that more than 60 per cent drop out before graduation, and that there is need for college training in the principles of economics and the knowledge of business procedure. With all of these educational difficulties the college faculties are trying to cope.

Turning from what may be termed the negative to the positive side, there was a general agreement that the function of the technical college is to give training in fundamentals of mathematics, science, the humanities and engineering. As a large part of the graduates eventually occupy administrative positions they also need training in human relations.

F. C. Pratt, vice-president General Electric Company, explained what his organization is doing to adapt technical graduates to the electrical industry. The program covers all grades of talent and of late special attention has been given to intensive training of a few scrupulously selected men for positions of leadership. The company is also co-operating with Union College and Massachusetts Institute of Technology to bring education and the electrical industry into closer touch.

At the conclusion of the meeting Dean G. B. Pegram, Columbia University, was elected president. Dean F. L. Bishop, University of Pittsburgh, was re-elected secretary.

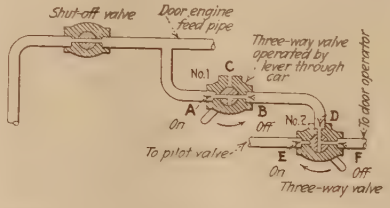
Maintenance of Equipment

Operating Rear Door from Any Point in Car

WHERE cars with door engines are used for either one or two-man operation and where safety automatic brake equipment is used it is desirable to control the rear door from different points in the car. For one-man operation both front and rear doors should be controlled by the operator from the front vestibule. With two-man operation, the front door should be controlled by the motorman, but the rear door should be under the control of the conductor. Where fares are collected in the car, it is necessary for the conductor to leave his station on the rear platform, and in such cases it is sometimes convenient to arrange so that the rear door can be operated from other points in the car than the conductor's station at the rear.

To provide for these conditions, the New York State Railways has provided valves in the piping for the rear door engine, as indicated in the accompanying illustration. This arrangement was devised by H. S. Sweet, engineer of equipment. Refering to the accompanying diagram, where one-man operation is used, the valve No. 2 is placed in its "on" position. This connects the pipe from the pilot valve to the door engine, which is designated on the diagram as *E* and *F*. The pipe *D*, which is used for two-man operation, is also closed off.

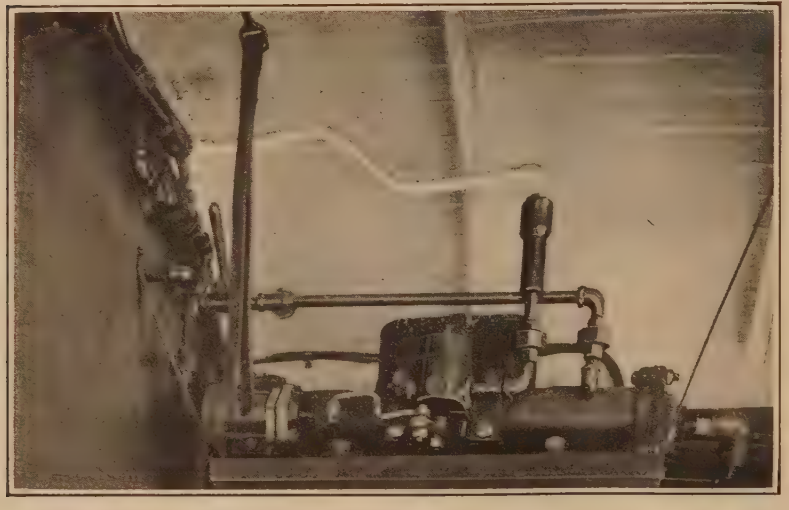
With two-man operation valve No. 2 is placed in the "off" position. This connects pipes *D* and *F* and closes



Piping Diagram for Rear Door Engines on Cars Operated by One or Two Men

pipe *E*, thereby allowing the rear door engine to be controlled by valve No. 1. This latter is a three-way valve, connected to a lever-operated rod which runs through the car and which was previously used for operation of the fare register. This valve No. 1 can thus be operated from any point in the car body, and by moving it to the "on" position the pipes *A* and *B* are connected, which connect the door engine feed pipe directly to the door-operating pipe. By moving valve No. 1 to the "off" position, pipe *B* and *C* are connected, so as to exhaust air from the door engine and close off pipe *A* from the feed pipe.

A shut-off valve is also installed in the door engine feed pipe and the emergency pipe is extended to the rear vestibule. In case of emergency, all that is necessary for the conductor to do is to open the shut-off valve, which will allow air to exhaust from the emergency pipe and throw the brakes into emergency.



Valves and Piping to Door Engine Provide for Operation of the Rear Door from Any Point in the Car Body

Punch and Die for Forming Journal Box Covers

BY T. E. WOOD

Master Mechanic Omaha & Council Bluffs Street Railway

JOURNAL box covers for practically all types of trucks used in Omaha are punched from sheet steel with the die equipment shown in the accompanying illustration. Both the die and punch are made of cast iron and are used in a large blacksmith's

Journal Box Covers in Omaha Are Formed Quickly in This Die

punch and shear. Covers for boxes of various sizes are all formed with the same die, and are then trimmed to proper size and shape on a serpentine shear. Thus the pieces may be run through the press in comparatively large lots and trimmed for various size boxes as required.

Engine Raised Auto Tower

HORSE-DRAWN tower wagons have been entirely replaced by motorized units for line construction and repair work of the Market Street Railway, San Francisco, Cal. These motor-driven towers have almost revolutionized the work of emergency line repairs on the system.

When the plan was made for changing to auto towers, two novel features were adopted. The tower was made of three stages instead of two, and was raised and lowered by

ıe auto engine. The first feature llowed the platform to be raised igher and, when telescoped down, he platform was lower than on the wo-stage tower, thus lowering the enter of gravity of the whole vehicle or safety, while operating at high peed. It also dropped the tower own so low that the clearance over he top of the vehicle was increased.

The second and most important ıovelty was the arrangement for aising and lowering the tower from he auto engine. This was accomlished very simply by the use of the ordinary hoist used to lift the front nd of the dump body on a dumpody truck. This had, up to that ime, never been attempted on a ower.

Formerly, when sent to a piece of epair work, the tower wagon stopped it the side of the street. The linenen laboriously raised the tower by the hand cranks, then they climbed to the platform, the driver drove out under the trolley wire, and the work was begun. With the motor-raised tower, the men are on top as the auto tower approaches the job. Before the auto reaches the scene of the work, the tower is raised by the chauffeur touching a lever at his side. When the location of the work is reached, the auto stops directly under it and the men instantly go to work.

Similarly, on leaving, the linemen formerly had to descend from the platform and cautiously lower the tower before the tower wagon could start away. Now the linemen remain on top and the chauffeur drops the tower at the same time as he starts away along the street. Time is saved at every turn, as well as labor, and the efficiency of the whole unit is increased accordingly.

Maintenance Practices on the Pittsburgh Railways

Tool Box Added to Compressor Outfit

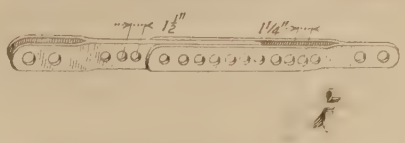
RELATIVE efficiency of track maintenance work on the different divisions of its property is indicated to the Pittsburgh Railways by the number of car derailments, which serves as a criterion. Each division, therefore, pays particular attention to see that its track remains in good operating condition. Pneumatic tools are frequently needed in this work. The company has provided a number of Ingersoll-Rand air compressor outfits of the type shown in the accompanying illustration. These are mounted on flanged wheels and are moved over the rails from place to place by work cars. After arriving on the job, they are lifted from the rails and placed at the side of the street in some convenient location. To facilitate the transportation of the pavement breakers and tampers attached to the compressor, the company has constructed wooden boxes on top of the cars. All tools used in connection with the air compressors are carried in these boxes.

Pneumatic Tools Operated by the Air Compressor Are Carried in the Wooden Box

Pin-Type Slack Adjusters Used in Pittsburgh

INSTEAD of the turnbuckle-type slack adjuster formerly used on the Pittsburgh Railways a pin type made in the company's Homewood shop is now standard. These consist of four parts, two sliding members, a round steel pin and a cotter pin. The sliding parts are punched with equally spaced round holes. On the outside member these are at 1¼-in. centers while on the inside member the spacing is 1½ in. The pin fits these holes. With this spacing arrangement it is always possible to find a position where the pin can be inserted.

The pins are heated in a small oil rivet heater, punched and bent with a die in a pneumatic riveter. Copper for the cotter pins comes in ribbons



Different Spacing of Holes on the Sliding Members of This Slack Adjuster Facilitates Insertion of This Pin

⅞ in. thick. This is cut into 8-in. lengths by metal shears, and then bent into proper shape by two movements of the pneumatic riveter.

Guard Protects Workman Using Metal Shears

WHEN cutting long metal rods or bars in a power shears it was found in the Homewood shops of the Pittsburgh Railways that there was a dangerous tendency for the end of the piece to fly upward when pressure was applied at the center. To prevent this a guard was arranged as shown in the accompanying illustration. A short length of 12-in. channel was bent to an angle of approximately 120 deg. in the bulldozing machine. Then a serrated piece of metal was fastened to the side of the shears and a similar piece riveted to the back of the channel. Bolts were installed to hold the channel firmly in place. Its position is regulated according to the thickness of the material being cut. The presence of this heavy metal piece alongside the shears has been successful in preventing an upward movement of the pieces being cut.

Channel Iron Fastened to the Side of Power Shears Prevents Upward Movement of Pieces Being Cut

New Equipment Available

Seamless Metal Hose

FLEXIBLE seamless metal hose, made by corrugating either seamless bronze or seamless steel tube, has been developed by the engineers of Charles Cory & Sons, Inc., New York, N. Y. Methods have also been worked out for attaching fittings of standard design and thread to this flexible hose by welding. The manufacturers claim an increased life for this type of hose over ordinary types and state that it can be used not only in the entire field where ordinary hose is now used, but also for pressures up to 10,000 lb. and temperatures as high as 1,000 deg. F.

Folding Arm Turnstile

A TYPE of turnstile with arms that fold down on one side as they are rotated has just been brought out by the Folding Arm Turnstile Company, J. H. Denton, sales agent, New York City. This type of turnstile is intended particularly for use on electric cars and at locations where space for the usual type is not available.

The new design has a cast-iron base mounting, the lower part of which is arranged for installing coils or interlocking mechanism such as is used with some prepayment systems. A rotating head with four arms made of aluminum tubing fits into the top of the pedestal, and on top of this a change tray is provided for convenience of the operator. A Veeder cyclometer with dial visible through a slot in the change tray records each quarter revolution.

The Arms of the Turnstile Fold Down on the Side Not Used for Passage

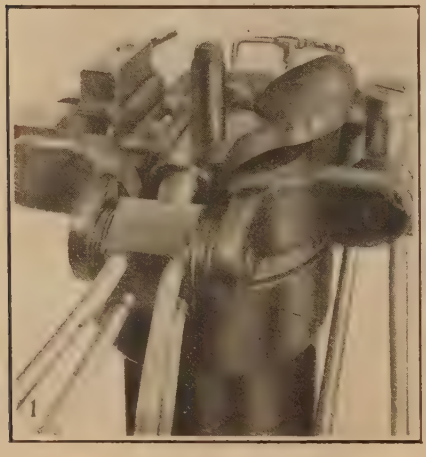
The base is 13 in. square at the bottom and tapers to 7½ in. square at the top. The round part of the base is 5 in. in diameter. With arms down, the outside radius of the revolving head is 7 in. and the radius to the end of the arms when up is 19 in. The height of the turnstile from floor to top of change tray is 3 ft. 3 in. The turnstile is intended for rotation in one direction only, but the direction may be changed by reversing the ratchet pawl. A positive stop is provided at each quarter revolution and release for the ensuing rotation is obtained by depressing a pedal. The location of the pedal in the base can be changed to suit varying conditions.

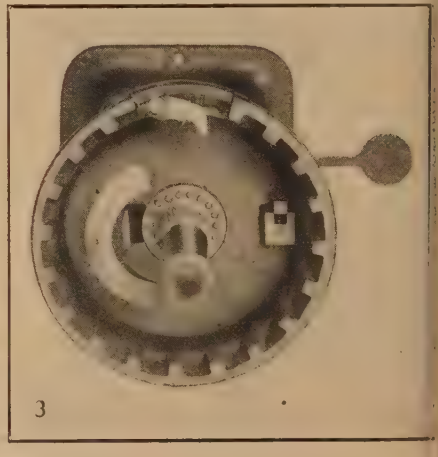
The rods which form the arms of the turnstile fit into steel blocks. These have an extension in the rear with rollers and the up-and-down motion of the arms is accomplished by these rollers sliding over stationary cams. Springs are provided on either side of each steel supporting block in order to provide for quick raising of the arms. The rotating head is provided with ball bearings at both top and bottom. These are of standard construction and can be removed as a unit. The operating mechanism lifts out from the top, so that inspection and repairs can be made quickly. The weight of the folding arm turnstile complete is about 185 lb.

Relay Calibrated Without Removing Cover

CONSTRUCTION for calibration without removing the cover by means of a knob projecting through the glass window at the upper part of the case is a feature of a new power relay brought out by the General Electric Company. This relay is for use in limiting the power on distribution lines to a predetermined quantity. It has a large range of calibration, running from zero to 1,000 watts, secondary.

This relay is manufactured in three forms; the "IG-102," an "over power" and "under power" device with contacts for controlling either alternating or direct current, and two "over power" devices, one for alternating and the other for direct current, known as the IG-103 and IG-104, respectively. By rotating the knob at the window the relay may be adjusted for operation at any deviation from the desired load. A graduated dial, mounted beneath a fixed needle, rotates with the calibrating knob, giving visible indication of the load setting.





No. 1. Cast Steel Cams Guide the Rollers on the Inside End of the Turnstile Arm and Produce the Up-and-Down Motion. Nos. 2 and 3. The Revolving Head Has Ball Bearings on Both Sides

The News of the Industry

City Will Buy Road

Phoenix Railway to Be Sold at Junk Value—Commission Claims Contract Is Illegal

Complications continue to pile up at Phoenix, Ariz. The city, through its commission, in a resolution unanimously adopted by its members, authorized the purchase of the equipment of the Phoenix Railway. As opposed to this the State Corporation Commission holds the proposed purchase to be illegal. If the city has its way it will purchase all the equipment and property of the company at their salvage value, to be determined by appraisers on or before Sept. 15 in anticipation of threatened suspension of service on Oct. 20. It is said that the city does not contemplate the operation of a railway but proposes to purchase the equipment at its junk value with the intention of interesting some concern in rehabilitating the system. There will be two appraisers, one representing the city and the other the company. In the case of a disagreement, a third appraiser will aid in determining the value.

Mayor Whitney, in a statement made following the session of the commissioners, said the fact that the City Commission had decided to purchase the equipment as junk was no indication that he, personally, favored municipal ownership of the Phoenix Street Railway. He said: "I am opposed to the city operating this street railway, temporarily or permanently, under any conditions whatsoever." He said if no arrangements were made to rehabilitate the system by the time that the owner, Mr. Sherman, abandoned his franchise, the city would then feel compelled to consider applications for bus franchises. The City Attorney says the city will be within its rights in purchasing the line because the franchise was granted before provisions of the charter quoted by the state commission were framed.

The Corporation Commission disapproves the agreement on the ground that it is illegal, not having been presented to the voters of the city. In accordance with the city charter, the commission pointed out, provision was made that the city could not enter into the purchase of a public utility without first having submitted the proposition to the people. The commission stated that it was not concerned with the operation of the public utility by the city, but that it did feel it should determine whether the action proposed was of a proper legal foundation.

The commission also called attention to a bonded indebtedness of $150,000 against the railway, which is a first lien against the property and which will continue as such unless some provision is made in the contract for cancellation. The commission claims that the contract leaves room for doubt as to the city's obligations and responsibilities. It further objected on the ground that no definite price was fixed in the contract for the purchase of the railway property.

Saginaw Transit Seeks Fare Boost

Petitions have been placed in circulation by representatives of the Saginaw Transit Company, Saginaw, Mich., furnishing street car and bus transportation, asking for a revision of the franchise making three-for-a-quarter ticket fares possible. The present franchise allows four tickets for 25 cents. The cash fare is 10 cents.

The company at Saginaw resumed operations in November, 1923, after a two-year period of suspension, but it did not furnish 100 per cent service until Jan. 1, 1924. The franchise terms of the new car-bus ordinance, which was approved by the voters on June 25, 1923, were reviewed in the ELECTRIC RAILWAY JOURNAL issue of July 14, 1923, page 70, and April 5, 1924.

Detroit's Mayor for Open Railway Meetings

Meetings of the Board of Street Railway Commissioners at Detroit, Mich., are to be open to the public by direction of Mayor Smith. Heretofore the policy has been to close the meetings of the commission to all except those immediately concerned, but the Mayor has requested that all future meetings be held at a fixed time and place and be open to the public.

In a letter to the commission the Mayor said:

> I desire respectfully to recommend that meetings of the Board of Street Railway Commissioners be fixed for a definite time and that a place of meeting be designated, which shall be open to the public.
>
> It is my belief the business of the Department of Street Railways should be wholly public. One of the chief factors in the decision of the people of Detroit to adopt municipal ownership as our settled policy was the belief that secrecy was not consonant with the proper operation of a public utility for the public's benefit. I believe the public is entitled to know every fact regarding the operation of its railway. I believe the public has a right to complete information regarding public business. I therefore make this recommendation.

Mail Pay Case Decided

I.C.C. Increases Rate on Independent Cars, but Keeps Pouch Service at Old Figure—Terms of Order Reviewed—Case Argued Early Last Year—Industry's Contentions Summarized

THE Interstate Commerce Commission decided the electric railway mail pay case on June 2. Under the decision there is no increase in the pouch rate, but there is a considerable increase in the independent car service rate and apartment rate. Thus, the independent car rate, for a car 36 ft. long, is 50 cents, whereas at the old rate it would have been 36 cents, and the department pays for an authorized round trip. There is also a notable increase in the apartment rate.

The post office department made a very technical analysis of costs, but made no allowance for load factor, excess mileage or excess space taken by the unit number of pouches and reached the figure of 1.87 cents per car foot-mile. After reviewing the argument on the closed pouch and other service, the commission issued an order regarding new rates, as follows:

> 1. That the present rates of pay for the transportation by urban and interurban electric lines of mail on passenger cars, on baggage or express cars, and in baggage and express compartments in passenger cars, are fair and reasonable.
>
> 2. That the fair and reasonable rate for independent cars devoted to the transportation of the mails, on which railroad employees handle the mails, is 50 cents per car-mile of authorized travel of cars 36 ft. in length, inside measurement. Where the railroad company is unable to furnish cars of the length authorized but furnishes cars of lesser length which are accepted by the department to be sufficient for the service, payment shall be made only for the actual space furnished, the compensation to be not exceeding a prorate of that provided for a 36-ft. car. Where cars exceeding 36 ft. in length, inside measurement, are authorized and used, the compensation shall be not exceeding a prorate of that provided for a 36-ft. car. In computing the car-miles of independent cars the space in both directions of an authorized round trip car run shall be regarded as the space to be computed unless the car or any part thereof is used by the company in the return movement.
>
> 3. That the fair and reasonable rate for railway postoffice cars and railway post-office apartments in cars, in which postal employees handle the mails, is 2 cents per linear foot, or fraction thereof, per mile of authorized travel in cars or apartments in cars 20 ft. or less in length, inside measurement, and in cars or apartments in cars more than 20 ft. in length, inside measurement, 2 cents per linear foot per mile of authorized travel for the first 20 ft. and 0.875 cent per linear foot per mile of authorized travel per each additional foot or fraction thereof. In computing the car-miles of full and apartment railway post-office cars, the maximum space authorized in either direction of a round-trip car run shall be regarded as the space to be computed in both directions.

A summary of the brief of the American Electric Railway Association case was published on page 664 of the issue of this paper for April 26, 1924. Briefly, it asks for a basic rate of 7 cents (for ten pouches or less) instead of the existing basic rate of 4 cents. It based its request partly on the claim that the pouches as piled took more room on the car than allowed by the department and that this represented, therefore, a larger proportion of the transportation service rendered per car-foot-mile than allowed by the depart-

ment. The association also showed that the average load factor in passenger cars, i. e., the relation between passenger miles and car seat miles (plus an allowance for the revenue space on the platforms) is only 42 per cent, so that this factor should be considered in calculations of the cost per foot-mile, as should also the mileage from terminal to carhouse. With these allowances and one for handling, the rate of 7 cents was obtained as a fair basis, instead of the 4 cents at present paid.

The case was argued early last year. W. H. Maltbie, Baltimore, represented the American Electric Railway Association and certain interurban and urban electric railways, and Frank Karr and C. W. Cornell represented the Pacific Electric Railway and two other electric railways on the Pacific Coast. Joseph Stewart, special assistant to the Attorney-General, represented the Postmaster-General. The last previous mail rate schedule of the Interstate Commerce Commission went into effect Dec. 6, 1920, and the claim of the electric railways was that the rates were inadequate to meet operating expenses and an 8 per cent return on the investment, whereas the Post Office Department recommended a lower rate than at present for the pouch service and the r.p.o. apartment service. In the year ended June 30, 1923, the Post Office Department paid out $569,195 for electric railway mail service, divided as follows: Closed pouch passenger service, $320,879; closed pouch baggage service, $101,524; r.p.o. cars, $46,320; r.p.o. apartment service, $92,065; independent cars and apartment service, $8,407.

Seeks to Drop Litigation Over Eight-Cent Fare in Philadelphia

A resolution was recently offered at a meeting of the transit commission of Philadelphia, Pa., in the office of the Mayor, requesting the City Council to instruct the City Solicitor to discontinue the pending action of the city before the commission for a reduction of the temporary fare granted to the Philadelphia Rapid Transit Company. The resolution stated that the company, through the maintenance of its present earnings under the 8-cent fare, would be enabled to build up a reserve that would provide for the various extensions and improvements of the transit system which are contemplated as part of the city-company program.

The meeting in the Mayor's office was originally called to consider a proposal to take over the Frankford, Tacony & Holmesburg Street Railway, which was sold on June 19 at auction by receivers for $350,000. Both proposals were submitted to a sub-committee for consideration and recommendation. Thomas E. Mitten, chairman of the executive committee of the P. R. T., attended the meeting and, at the invitation of the Mayor, told the residents of the northeastern section of the city and the members of the commission present the program which the city and company, co-operating, could carry out if the present P. R. T. earnings were maintained.

Utility Building Dedicated at Pittsburgh

Investing a building with personality might aptly be termed the plan of procedure followed by the Philadelphia Company and affiliated corporations of Pittsburgh in throwing open for public inspection and use its new office building. Through the use of the slogan "The House of Service," the company has given the building an individuality sufficient to make it stand out prominently in the city. In the structure are to be found the headquarters of the Pittsburgh Railways, Duquesne Light Company, Equitable Gas Company,

Pittsburgh's "House of Service"

Allegheny County Steam Heating Company and various subsidiary corporations.

Promptly at noon President Arthur W. Thompson, before the massed public and employees, dedicated a table consecrating the building to public service.

As a fitting climax to the opening ceremonies, a banquet was held in the roof garden of the William Penn Hotel. The guests included prominent bankers, business and professional men, public officials, representatives of public utilities from nearby cities and states, service club members, newspaper men and others of the Pittsburgh district. President Thompson presided at the dinner. Although the main banquet facilities were inadequate to accommodate all of the employees, the proceedings and speeches were made available by broadcasting the event through KDKA, the Westinghouse station.

As a fitting climax to more than 40 years of public service, the celebration incident to the dedication of the building brought prominently before the residents of the community the fact that the utilities have been performing a public service for the past forty years, with an expressed resolve to be of even greater service in the years to come.

Vote on Bus-Street Car at Lincoln

The Council of Lincoln, Ill., has passed the solution of its troublesome municipally owned railway to the electorate. Mayor Howard Engle openly termed it "passing the buck to the people." Guy LaBaw, manager of the municipal railway, went to the Council with a petition for a bus line, but after discussion it was decided to let the people vote on the question of whether they want buses or the railway. Early suspension of the railway was predicted by Mr. LaBaw as a result of the refusal of the Council to authorize him to make needed expenditures.

No Definite Progress on Buffalo Program

Scrapping of seven railway lines in Buffalo and the introduction of double-deck buses on five new lines are proposed by the International Railway as part of the city-company plan of operation now being discussed at conferences at which were present representatives of the traction company, Mitten Management, Inc., Philadelphia; members of the Buffalo City Council, the Chamber of Commerce and publishers of Buffalo daily newspapers.

Herbert G. Tulley, president of the railway, says adoption of the plan would tend to better transportation in widely separated sections of the city. Many of the car lines which the company would abandon are now operated with a one-man crew as an economy measure while city-company negotiations are in progress. Mr. Tulley said traffic congestion in many parts of the city and the increased use of the automobile were delaying the operation of street cars and speeding up the time when buses must be used for quick transportation on lines where passenger traffic is not unusually heavy during rush hours.

The application of the International Bus Corporation, a subsidiary of the railway, for permission to reroute the Delaware Avenue-Kenmore bus line was denied pending consideration of the new bus proposals in their entirety.

Arbitration at Boston Deadlocked

Up to June 25 there has been no change in the arbitration situation either on the Boston Elevated Railway or the Eastern Massachusetts Street Railway, Boston, Mass. The lawyers for both cases have daily sessions over the question of who shall serve as the third arbitrator in each case. Many men have been proposed and rejected for the office of neutral arbitrator, but these names are not to be made public.

James H. Vahey will represent the carmen in both cases, Roland W. Boyden will represent the Elevated in its case and Fred Cummings will represent the Eastern Massachusetts in its case. Practically every day Mr. Vahey calls first on Mr. Boyden to discuss with him the third arbitrator for the Elevated, then he calls on Mr. Cummings relative to a third man for the Eastern Massachusetts. They are practically deadlocked. The Boston Elevated employees have indicated that they will make some new proposition to the trustees, presumably relative to the method of arbitration, but they have not yet communicated with the trustees about it or stated what their proposition will be.

Kansas Controls the Bus

According to announcements made at Topeka, Kan., on June 20, buses operating in Kansas are subject to state regulations just as strict as those applied to railroads, electric railways and other common carriers. The Public Service Commission announced the rules effective from June 22.

Bus companies will have to file with the commission schedules giving the rates and tariffs to be charged, and no company will be allowed to change either without the consent of the commission; once a bus company gets a permit service cannot be discontinued without the consent of the commission. Licenses will be revoked whenever a line stops service for five days.

Tickets, printed to show points of origin and destination, and fares charged will be required and regular freight schedules will have to be presented to the commission for approval.

The rules also provide that the drivers of all buses carrying passengers must be not less than 21 years old, of good moral character, must be physically fit and must have had at least two years experience as chauffeur.

The commission will check the finances of all companies operating buses within the boundaries of the state. All companies will be required to obtain permission from the commission to issue stocks, bonds or notes, and will be required to submit both quarterly and annual reports of operations and financial condition. The following information must be incorporated in each quarterly report:

Revenue and expenses during the preceding quarter.

General financial statement of assets and liabilities.

A report of the amount involved in, and the nature of all claims pending, if any, and the status of the claim at the time of the report.

Number of passengers and tons of freight carried during the preceding quarter.

Make of each vehicle, with capacity and number of miles operated.

Any additional information that may be called for by the commission at any time.

There are 41 principal rules, each of which is subdivided into additional rules. The rules also make provision for damage insurance based on the size of each coach and the number of passengers carried at capacity load.

The rules were promulgated as a result of legislation passed at the recent session to put buses under the jurisdiction of the commission.

Chancellor Upholds Act of Tennessee Legislature

"I am constrained to dismiss the bill and to hold that the act is valid and the law of the land." In this manner did Chancellor John R. Aust in Chancery Court recently dispose of the case of M. S. Adams against the Nashville Railway & Light Company, in which the complainant had brought suit against enforcement of the law prohibiting the use of one-man cars in any city of Tennessee having more than 30,000 population. The complainant averred that he was a stockholder in the defendant company and that therefore he was materially interested in the matter. He asserted that for the company to comply with the act would cost $150,000 for initial equipment and an annual increase of $75,000 in operating expenses. The answer of the company admitted the allegations of facts contained in the complainant's bill.

Chancellor Aust said that the act was passed by virtue of what the Legislature conceived to be a proper exercise of the police power. The question was not one, therefore, of power, but whether or not a rightfully possessed power had been properly exercised. An appeal was taken to the Supreme Court.

The decision in Nashville is directly opposite to the finding at Knoxville. There Chancellor Brown declared the act unconstitutional and enjoined the Knox County sheriff and Attorney-General from enforcing it, pending the outcome of an appeal. Attorney-General Thompson of Tennessee is a party defendant in the suit brought by the Knoxville Power & Light Company.

Shipment Sent by Electric Railway Meets Emergency

What is believed to be a speed record in delivery of special track materials to the Community Traction Company, Toledo, was made recently in connection with the Summit Street extension track-laying job.

The concrete slab put in a year ago by the contractor when half of the base for the track was laid and half of the pavement base put in was found by mistake to have only 8-in. clearance to the top of rail. This would not accommodate the 6-in. rail and 3-in. tie. Therefore the work was held up.

P. J. O'Neill, railway engineer of the company, telephoned for the special material to a Cleveland concern at 1:32 p.m. on June 10. This order was completed at 4:50 o'clock that same afternoon, shipped by electric railway freight on the Lake Shore Electric Railway to Toledo, arrived at 7 a.m. on Thursday and was in the track by noon of that day.

The local railway men believe this is a real case of co-operation and that it also demonstrates the rapid freight facilities of electric traction which merit the support of all urban railway properties and the manufacturers in the field.

Tune in on WCAP for a Treat!

On Monday, June 29, between 8 and 9.30 p.m. the electric railway industry throughout the country as well as the general public will have an opportunity to judge of the success of a railway in developing musical talent within its ranks. At that time the band, the male chorus, and the ladies' chorus of the United Railways & Electric Company of Baltimore will broadcast a program from Station WCAP, Washington.

These musical organizations have been trained by the United Railways in line with its policy to encourage the family and social spirit among its employees. Each of them has appeared publicly on various occasions, but this is the first time they have all appeared on the same program, and the first time any of them has broadcast from one of the major stations.

The band was organized about seven years ago and was trained by its present director, B. O. Belt, a capable instrumentalist, who is a dispatcher at one of the United's carhouses. Practically all the members of his band are from the transportation department. The band's first active experience was in connection with Liberty Loan sale meetings throughout the city during the war. It has given many public concerts, participated in a number of parades, and was taken to the national Rotary convention by local Rotarians a couple of years ago.

The male chorus is composed principally of men from the transportation departments and the shops. It was trained and is directed by John P. Tingle, secretary to President Emmons. Mr. Tingle is choir director of the Pro-Cathedral of the Protestant Episcopal Diocese of Maryland. He also directs the ladies' chorus, the most recently organized musical body of the United. It is composed of young ladies from the general offices of the company.

In all about 100 vocalists and instrumentalists will go to Washington in special cars to participate in the broadcasting program. A well rounded program has been arranged with something of interest to everybody. In announcing the program the railway company said it would appreciate hearing from any of its friends who listened in.

President Emmons Not a Bit Disconcerted

Rockford City Traction Again Wins Franchise

Members of the City Council of Rockford, Ill., by a ballot of nine to seven have voted a third franchise to the Rockford City Traction Company. The two previous ones were lost, one in a referendum and the other by a mayoralty veto. As voted by the Council, the franchise prohibits operation of one-man cars, assesses track paving costs against the utility, assesses one-third of the costs of a new State Street bridge over Rock River against the utility, requires the company to lay grooved rails in all new construction, prohibits the utility from taking advantage of any terminable franchise legislation that may be enacted by the Legislature and provides means whereby the city can become owner of the line under certain conditions.

Indications were that Mayor Hallstrom would sign the ordinance, or at least let it become effective without his veto. The railway has 60 days in which to accept or reject. Arthur D. Mackie, special representative, stated that the company could not accept the franchise with its "objectionable" features, but added that he would pass it to the owners without recommendation.

On the other hand, the City Council has definitely shelved proposals of Messrs. Mordaunt and Stedman and the City State Investment Company, sponsors for the Rockford Transportation Company, which advanced a plan intended eventually to develop into municipal ownership.

San Francisco Municipal Railway Outlook

M. M. O'Shaughnessy, city engineer of San Francisco, Cal., says that at the present time there are no surplus funds, either from the sale of bonds or from earnings of the San Francisco Municipal Railway, nor does the present rate of fare show a possibility of surplus funds in the immediate future. Under these circumstances he says the only way to secure Municipal Railway extensions is through the issuance of bonds. According to Mr. O'Shaughnessy, this matter has been frequently discussed, but action has been deferred by the board of supervisors on the grounds of waiting for the outcome of the negotiations for the purchase of the Market Street system.

These and other comments are contained in the report of Mr. O'Shaughnessy to the city for the fiscal year ended June 30, 1924, an illustrated booklet of 112 pages just made public. According to him nothing of a constructive nature has been done the past year toward the acquisition of the properties of the Market Street Railway. A valuation of this property was made by his office during 1921, and all legislation necessary to take over the entire property was provided by a public election held in November, 1923. He says the importance of reaching a definite settlement of this question has been pointed out in several previous instances, but that the dual ownership, with pending acquisition of the private corporation, makes it difficult properly to expand the municipal system.

Negotiations between the city and the Market Street Railway have been in the hands of a special committee, appointed by the Mayor, of Supervisors and other city officials.

Higher Fares Predicted for New Orleans—Loan Studied

R. S. Hecht, chairman of the board of directors of the New Orleans Public Service, Inc., New Orleans, La., recently declared before the railway wage arbitration board that the company could not get along on the reduced carfare it agreed to three years ago if it were forced to increase its payroll. The company is seeking a wage reduction.

Mr. Hecht said the 7-cent carfare had cost the company more than $1,000,000 in three years, this being the difference between the allowable rate of return and the amount that had actually been realized. He said, further, that the company had continued on the reduced rates because of its desire to deal fairly with the public in the hope of later getting the benefit of the extensive improvements now being made.

The New Orleans Public Service has sought authority to issue $5,000,000 in bonds for improvements already made or contemplated. It is stated that the city authorities will, before giving a final answer to the request, order that the company show the Commission Council in detail just what the $5,000,000 is required for. Further, that in case the city does give its approval, it is understood that the money from the bonds be added to the rate base, on which the company is allowed to earn 7½ per cent, only as it is actually expended dollar for dollar in improvements.

Safety Stressed in Montreal

Demonstrations in accident preventions were included as part of the program of the Province of Quebec Safety League in its celebration of Safety Week, June 7-13. At the invitation of the Mayor of Montreal about 500 public-spirited citizens attended an inaugural dinner meeting on the first evening of the week to listen to interesting talks on accident prevention. In addition to advancing the cause of safety during the week the league conducted a $50,000 campaign seeking generous subscriptions for "the life of one near and dear to you." Such a fund, according to the literature printed for distribution during safety week, would cover a two-year budget, would save 25 to 50 lives a year, prevent innumerable serious injuries and save much money in property damages. Subscription forms were prepared, with blanks, to fill in the amount of money to be turned over to the league "as evidence of my interest in the educational service rendered the community by the Province of the Quebec Safety League in its endeavors to prevent accidental fatalities." Arthur Gaboury, formerly of the Montreal Tramways, is general manager of the Province of Quebec Safety League, Montreal.

Minority Rejects Chicago Elevated Wage Proposal

The smooth trend of the wage negotiations in Chicago has been broken by an adverse vote on the scale of the elevated employees. The "L" employees, who always vote on their scale after the Surface Lines union men have signed a new agreement, gave labor leaders no less a shock than transportation men by returning a negative vote on terms similar to those already ratified by the larger union embracing the street cars.

Company officials were in a quandary over the sudden reversal, but were equally surprised to find in the organ of the Amalgamated in Chicago a complete explanation of the vote that amounted almost to an apology.

The labor editor revealed that the vote represented only 27 per cent of the membership of the local and continued to say that the small attendance was due to the general apathy to union agreements that comes with contentment. Most of the men, the editorial said, had taken it for granted that whoever went to the meeting would, as usual, vote for the agreement submitted, as had the Surface Lines unions.

Company and union officials are conferring about the best line of procedure to put the agreement to another vote. Except for minor working conditions, the terms are the same as those existing previously.

B. J. Fallon, general manager of the elevated, conferred with John Bruce, union president, and a committee on June 25. Mr. Fallon made it plain that no increase would be granted.

"There is absolutely no chance," said Mr. Fallon.

"We haven't the money, and there is no money in sight."

The scale is 77 cents for motormen and 71 for guards.

Car at Montreal Carrying Safety Message

Cincinnati Franchise Advanced to Printing Stage

So far have the conferees advanced ›ward final agreement as to terms of new traction franchise for Cincinnati,)hio, that it has been decided to print he document for submission to the City Council with blank space only for the nsertion of two comparatively unim›ortant items. These are whether ickets shall be sold in strips of six ›r in strips of six and three and whether the cash fare shall be 10 cents ›r 9 cents. These questions will have ›o go back to the directors of the Cin›innati Street Railway, but the senti›nent seemed unanimous for tickets in ›trips of both three and six at the rate ›f 8⅓ cents and a cash fare of 10 cents.

The new ordinance will contain no ›rovisions regarding buses. The pres›nt idea of City Council leaders is that a distinct standing committee on buses shall be created to consider all appli›ations for the reestablishment of bus routes and report back to the Council, as does the present street railroad committee on applications for the establishment of new street railway routes.

It was announced that the board of directors of the street railway consented to a provision fixing the return on capital stock for the first three years of operation under the new franchise at 5 per cent with 6 per cent thereafter. It constitutes a surrender of one-sixth of the dividend for three years, something that was insisted upon by members of the Mayor's traction committee.

Railway Participates in Bridgeport Progress Week

"Progress Week" was held in Bridgeport, Conn., from May 30 to June 6. It brought a large attendance. Some 200 concerns exhibited their products and merchandise. One of the most interesting and extensive exhibits was furnished at the booth of the Connecticut Company. A working model of a power house was shown with overhead traction wires, permanent tracks and passenger and freight cars in continuous operation thereon. Large blueprints were exhibited to give an example of the life-time growth of the company. In 1894 it was seen that the Connecticut Company operated only 46 miles of track compared with 1,042 miles of track today. A model pioneer locomotive, used in Derby and Ansonia in 1888, illustrated the idea of the first attempt to haul freight by electric power. The overhead wire was an exact reproduction of the heavy cables used on all lines. It was manufactured by the Bridgeport Brass Company of Bridgeport.

Motorman Pate Forgot—One Killed, Fourteen Injured

One man was killed, one seriously hurt, a dozen or more passengers were injured, two interurban cars burned and a trestle was destroyed as the result of forgetfulness on the part of Clarence H. Pate, operator of a one-man interurban car on the Prospect or River Road line of the Louisville & Interurban Railroad, a subsidiary of the Louisville Railway, on the evening of May 26. Pate's orders were to await at Harrodscreek siding to let an outbound car pass him. Instead he came on toward Louisville, and on a trestle across Goose Creek, his car met head-on that of William F. Edwards. Vestibules were telescoped to the front rows of seats within the cars. Motorman Edwards was pinned in the wreckage and burned to death in the fire that followed the collision. Fourteen passengers were injured. Motorman Pate suffered a broken collarbone.

As he saw the other car rushing toward him Pate is alleged to have exclaimed: "My God, I forgot." Company officials announced that the accident was due to Motorman Pate's failure to follow instructions.

Both men had been with the company for years.

Strong Case by Dissenting Arbitrator

Although Overruled, Representative of Atlanta Company in Recent Wage Dispute Laid Down Statement of Sound Economic Doctrine—Digest of Opinion

C. M. CANDLER'S dissenting opinion in the recent wage arbitration at Atlanta, Ga., has been the cause of no little comment in Atlanta and elsewhere in the South. His contention was that a living wage for the employee could be met only by a living wage for the employer. Mr. Candler represented the Georgia Railway & Power Company on the board of three to whom the matter was referred for settlement. His associates were Edwin F. Johnson and Luther Still.

As explained recently in the ELECTRIC RAILWAY JOURNAL, Messrs. Johnson and Still granted an increase of 3 cents an hour to motormen and conductors and of 6 per cent to other employees. This made the scale for motormen and conductors 46 cents an hour for the first nine months of service, 51 cents for the next nine months of service and 54 cents thereafter, effective as of May 1, 1925, to continue through Dec. 31, 1925, or as long thereafter as may be mutually agreeable to the company and the association, except that notice in writing may be given at least ten days in advance of a desire on the part of either the association or the company to negotiate a new wage scale after Dec. 31, 1925.

Under an agreement similar to the one under which the board recently acted the same three individuals on March 24, 1924, by a majority vote (Messrs. Johnson and Candler for, with Mr. Still dissenting) fixed a scale of wages to apply during the entire calendar year 1924. Under dates of Dec. 30, 1924, and Jan. 1, 1925, the company and the employees agreed to continue the scale in force into the year 1925, without any definite term, subject to ten days notice. In the meantime the employees made a demand for increases in the 1924 scale, and, the parties failing to reach an agreement by negotiation, on April 13 entered into the agreement. In other words it was only a little more than a year since the scale carrying increases of approximately 7 to 10 per cent was prescribed. Mr. Candler said that the question which logically arose is: Have conditions which entered into the consideration of proper wages in March, 1924, so materially changed in May, 1925, as to require or justify an upward revision of the scale?

The evidence submitted at the hearing was largely confined to this question. It was contended by the employees that the cost of living in Atlanta had increased materially since the last arbitration. Evidence in the form of retail food prices quoted by two retail grocers in Atlanta on a limited number of articles for one day only was submitted in support of this contention. The company submitted estimates as to the cost of living in Atlanta made by the United States Bureau of Labor and also by the National Industrial Conference Board. From all the evidence before the board, Mr. Candler was of the opinion that the cost of living in Atlanta, in so far as it entered into a consideration of wages, had not increased so materially over March, 1924, as to justify the increase in wages awarded by a majority of the board.

Mr. Candler also disagreed with the contention by the employees that traffic conditions in Atlanta had grown so bad that the services of trainmen were performed under greater nervous and mental strain. He said the recent establishment of stops at numerous traffic boulevards, the elimination of jitneys from streets upon which cars are operated and other traffic regulations adopted during the past year would rather tend to render street car operation safer and offset the possible effect of any slight speeding up of schedules in non-congested sections.

During the hearing the probable effect of jitney elimination upon the company's revenues was discussed. In Mr. Candler's opinion the effect for a year or any fair period of operation can only be estimated, not with such certainty as to justify the imposition of a large, definite, additional expense burden upon the company. In conclusion he said:

> It must be borne in mind that a public utility occupies an entirely different position from that of a private industry. If the wage scale of a manufacturer is increased he offsets the increase by a corresponding increase in the selling price of his products. If because of competition or for other economic reasons this cannot be done, he can suspend operations until conditions are improved, or quit business altogether, or remove to some other more favorably located city.
>
> The utility cannot increase its rate; it cannot remove to another city; it must go on at the rates fixed by the public, operate under regulations prescribed by the public, and in the case of the Georgia Railway & Power Company pay wages fixed by arbitration.
>
> I concede that the cost of living has a place in the consideration of a wage scale, but I also contend that the ability of the railway to pay wages must enter into the consideration. A living wage for the employee can only be met by a living wage for the employer.
>
> The company submitted evidence show-

ing that its railway net earnings were approximately $273,000 less in 1924 than in 1923, and less for the first three months of 1925 than for the same period in 1924, failing by $118,000 to meet interest charges alone. No evidence was introduced to discredit these statements of actual results.

The company contends that the wages now in effect have been and are sufficiently attractive to bring to it many applications for employment, approximately 600 having been made since Jan. 1, 1925, only 80 of which could be accepted as railway trainmen. This fact would indicate that the railway service and wage must be equal to or even more attractive than employment in other lines open to the employees.

The evidence submitted further showed that of 41 street railways in the South, only three pay higher wages than are paid in Atlanta; two pay the same top wage as Atlanta and 35 pay lower wages than Atlanta. It was further shown that the average top wage of these 41 companies is 45.7 cents an hour as compared with 51 cents in Atlanta, in effect at this time, or 54 cents as fixed in this award.

Taking into consideration the entire record of this arbitration, I am of the opinion that conditions in Atlanta affecting railway wages do not require or justify any increase in the existing scale and that the same should be continued in effect through the year 1925.

More Subway Routes Validated in Brooklyn

Borough President Maurice E. Connolly of Queens swung into line for Mayor Hylan's proposed $542,000,000 independent municipal subway on June 19 and the Board of Estimate validated the Queens routes proposed by the Board of Transportation with one slight change and with one proviso by Mr. Connolly. The change was the inclusion in the Board of Transportation's plans of the so-called Steinway loop. The loop will be about half a mile in length and will cost about $3,000,000 additional. Mr. Connolly announced that he would vote for approval of the route, but added that, when it became time to appropriate money for construction, he would insist that the line in Queens Boulevard be built as a covered subway. This will cost $20,000,000 additional.

The action by the board completed the validation of all the routes proposed by the Board of Transportation for Manhattan, the Bronx and Queens. As Richmond has no place directly in the city's proposed subway system, that left only the Brooklyn routes unvalidated. The matter of the Brooklyn routes will be considered on July 1.

Beaver Valley Veterans Serve 500 Years

Of the frequent and varied publicity of the Beaver Valley Traction Company no advertisement touched a warmer spot in the hearts of the men and the public than the full page announcement in the Beaver Falls *Tribune* recently, entitled "500 Years Training to Serve You." The introductory box at the top read:

> There can be no greater evidence of loyalty and success of endeavors to please than that exemplified by length of service. Here we present twenty-four members of our personnel whose years of service total more than 500.

The illustrations comprised portraits of operators, flagmen, dispatchers, shopmen and others who had served from 16 to 25 years. The center of the page showed a drawing of the latest double-truck safety cars ornamented with the portraits of John R. Marshall, superintendent of transportation (24 years) and W. F. Allshouse, track foreman (24 years). The ad concludes:

> We view the public as our friends and patrons and know that in the degree that we serve depends our progress, the progress of this company and the community.—Employees Beaver Valley Traction Company.

Owing to the popularity of the announcement, the advertisement was reprinted by C. D. Smith, general manager, on special paper for display in the homes of employees and others who wished to have a more permanent record than the newspaper publication.

Importance of Railway Told in Seattle Advertisements

The Seattle Municipal Railway, Seattle, Wash., has started a six months advertising campaign in the Seattle daily newspapers. The advertisements will appear in each of the four daily newspapers each week. An appropriation of $10,000 from the railway funds was made by the City Council a month ago to be spent under the direction of Clark R. Jackson, superintendent of public utilities, to stimulate travel. The contract for handling the advertising has been let to a local agency.

The campaign will deal with the importance of the railway to the city in promoting its growth and prosperity,

Seattle Advertises to Stimulate Traffic

the need of extensions and adequate service to stimulate the growth of industry, commerce and population and the measure of success attained in six years of municipal operation.

The public will be reminded of all of Seattle's scenic districts and beauty spots and advised as to how they may be quickly and comfortably reached by street cars, so that both residents and tourists may be aware of the large number of sightseeing trips possible by street car. In the Seattle Times of May 18 the following message was given to the public:

> Few Seattle citizens, to whom rapidly moving street cars are a common sight of daily life, realize the important part the street railway system has played in the development of the city and its vital relationship to our present prosperity and our future growth.
>
> Few who ride on street cars daily ever stop to think that Seattle would be a small saw mill center huddled along the waterfront today had not the street railway system, from the early days of the city, constantly stimulated the city's growth by extending car lines and furnishing the rapid transportation necessary to growth of industry, business and population.
>
> Without the street cars, to get people rapidly from their home to work and about the city on their business, Seattle would have stagnated, instead of becoming the wonder city of the continent, for rapid transportation is the most important element in the growth of modern cities. Without the street cars industries and population would have located elsewhere.
>
> What is true of the past is true of the present and will continue to be true in the future. Were street car service, the main means of rapid transportation, discontinued tomorrow, the productive capacity of Seattle's industry, business and citizens would be so reduced as to cause disaster to all.
>
> If Seattle's street car service is not extended to meet the needs for growth of our industries, commerce and population, the growth we are enjoying will be retarded and Seattle will be robbed of its destiny as a great world city.
>
> The real interest of Seattle citizens in the Municipal Street Railway System is not political but economic; on its successful operation and adequate service their individual prosperity largely depends. Its welfare is of personal interest to every one of them.
>
> The Seattle Street Railway System, though successfully operated, has its problems. They are problems of public service which the individual citizens can help largely to solve. Following this announcement, we shall invite, through the newspapers, the help of Seattle citizens in solving some of those problems. It is your street railway and we invite you to give it your thought.

Central Interurban Station at Kansas City Unlikely

The project of a central interurban station in Kansas City, Mo., to cost the Interurban Central Station Company $3,000,000 appears about to fade into oblivion. C. C. Peters, president of the company, said that it is hard to foresee just what will happen. The City Council passed a franchise on Jan. 6, 1918, authorizing the company to build a station at Tenth Street and McGee Trafficway. The company posted $50,000 to guarantee that the station be built by Feb. 7, under an extension of the time fixed in the original ordinance. The Kansas City Railways was a party to the contract with the city, but the receivership of that company presented a further obstacle.

Definite plans were outlined on two occasions since the passage of the ordinance, but each time construction of the station was blocked by new obstacles. There has been little or no mention of the project recently, but there was much agitation for a central station following 1914. It is possible the plans may go forward, but much is said to depend upon how the court regards the railway agreement section of the franchise. Hughes Bryant, building adviser to the railway, is said to have expressed the opinion that the expenditure of a large amount of money in the construction of an interurban station is inadvisable under present conditions.

The site is now being used as a parking station at an annual rental of $20,000, enough to care for the taxes and all expenses of the property.

New Competition—Planes Between Springfield and Dayton

Hourly airplane passenger service between Springfield and Dayton, Ohio, will be started June 29. The flights will be made between Tecumseh field and Avondale field at Dayton, and planes will be able to transport two passengers and their luggage each trip.

Tecumseh flying field is 4 miles west of Springfield in the National road and is reached by buses of the Columbus Dayton Transportation Company on the Dayton route. The buses also pass Avondale field in Dayton.

Recent Bus Developments

Chicago Surface Lines Proposes Auxiliary Service—Pittsburgh Status Explained—First Interurban Auxiliary in Utah—Activities in Other Cities

THE first definite step to use the motor coach for auxiliary service has been taken by the Chicago Surface Lines in a proposal made to the city to forego the franchise requirements for this year's track extensions and substitute pneumatic-tired buses.

While the city claims the right to stipulate more than 20 miles of trackage extension a year, only half that amount was asked for by the local transportation committee of the City Council this year. The Surface Lines has $800,000 available and informed the Councilmen that this would build less than 10 miles, but that good service could be provided to outlying communities at less expense if the company bought several hundred buses instead of putting down track in sparsely settled communities.

The final authority in the matter is the Illinois Commerce Commission. No agreement has been reached between the city and company, but it is expected that at least part of the extension program will be dropped and the territory experimentally served by bus.

The City Council of Watertown, N. Y., recently granted the request of the Black River Traction Company to rescind its franchise on High, Factory and Pearl Streets, and at the same time granted the request of the Watertown Transportation Company to acquire the franchise to operate buses over these streets. Leon Schwerzmann, superintendent of the company, furnished statistics to show that this branch had eaten into the profits of the main line. In answer to the arguments of the New York Air Brake Company employees that the line must have paid during rush hours and that the line was needed by employees of the industries, Mr. Schwerzmann said the company would be glad to give the High-Pearl Street branch to them. All they would have to do would be to buy a couple of cars and furnish the power. He said the traction company would agree to accept transfers under an order of the Public Service Commission. The matter will now have to go before the Public Service Commission for its action. The petition of the company was referred to in the ELECTRIC RAILWAY JOURNAL, issue of May 23, page 829.

The interests that control the Pittsburgh Railways, Pittsburgh, Pa., will also control the buses, but the two will be conducted under different supervision. This statement was recently made by Thomas Fitzgerald, vice-president of the company, in announcing that preliminaries were now going on between the incorporators of the Pittsburgh Motor Coach Company and the Traction Conference Board, which would eventually decide the relations of the buses to the street cars. He said the bus experiment will start soon after an agreement is entered into with railway officials, board members, the Public Service Commission and officials of the coach company. There were a number of reasons why the Pittsburgh Railways could not operate buses, but the principal one was that the railway, just out of receivership, had not the credit to finance the purchase of equipment. He said that the value of the bus line was in its co-ordination with the railway; that where the cost of installing tracks, power plants and other expensive equipment was not warranted buses might sometimes be used to advantage.

The Utah-Idaho Central Railroad, operating an interurban railroad between Ogden, Utah, and Preston, Idaho, has applied to the Public Utilities Commission of Utah for a certificate of public convenience and necessity for the operation of a passenger and freight automobile stage line between Ogden and Logan, Utah, a distance of about 50 miles. The petition sets forth that such service would enable it to serve the public more adequately. It is asked that the certificate shall provide that "in all cases of bad roads or inclement weather, and when, from causes beyond its control or otherwise, it is impossible or impracticable to operate motor vehicles over said route, it be permitted to furnish said transportation service over its existing lines of railroad, so as to carry on uninterrupted its transportation service between the points named at all times during the year." This is the first instance, so far, in the State of Utah where an interurban railroad has applied for permission to operate an automobile stage line as an auxiliary to its railroad service.

The Reo Motor Car Company, Lansing, Mich., has established a fellowship in highway transport to be devoted to investigations under the direction of the division of highway engineering and highway transport of the University of Michigan, covering an approved subject relative to the utilization and operation of buses. The Reo Motor Car Company fellow will make investigations relative to the economic fields of bus transportation and efficient methods of operation for urban and intercity bus systems.

Selectmen of Millbury, Mass., have made known that no permits to operate buses between Worcester and Millbury will be granted this year, even to the Worcester Consolidated Street Railway. The Selectmen have ruled that the present railway service is sufficient. The Selectmen contend that if permits were issued the town might lose $14,000 in taxes now received from the Worcester Consolidated Street Railway.

Railway service has been supplemented by city bus service on the Wisconsin Power & Light Company's south side line in Sheboygan to determine which of the two methods is the more acceptable to patrons. If the trial bus service handles the traffic sufficiently cars will be taken from service on the south side. Buses will operate on the same schedule as the cars, at the same fare.

The City Council of Champaign, Ill., recently took the first steps to authorize bus service in the city by the Illinois Traction System when it passed an ordinance permitting the use of certain streets for bus operation. No routes have been designated. Transfers from bus to bus and from bus to street cars will be authorized. The railway plans to spend $150,000 for equipment, including a new garage.

It is said that an ordinance is being prepared by the Meridian, Miss., City Council to supplant the railway service of the Meridian Light & Railway Company by buses. At the request of the Mississippi Power Company, which recently acquired the traction property, the question is to be submitted to qualified voters at an early special election.

Four feeder routes, each about 1 mile long, will be started by the Omaha & Council Bluffs Street Railway, Omaha, Neb., as soon as delivery is secured on five White buses with Weir bodies. The company has recently been granted an increase in fare, as related in ELECTRIC RAILWAY JOURNAL for June 20, page 989. Transfers will be given free between trolleys and buses.

The Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., is operating a new bus route on an hourly schedule between the Dempster Street terminal of the Niles Center line and Desplaines and at slightly longer intervals between Wauconda and Lake Zurich, popular northern Illinois summer resorts. The line is 29 miles in length. The running time is one hour and 25 minutes. The North Shore Line is operating special chartered coaches as well as regularly scheduled summer tours, as last year, the tours being of one, three and five days duration.

T. W. Wilson, vice-president and general manager of the Wilmington & Philadelphia Traction Company, Wilmington, Del., recently announced that the Delaware Bus Company, which is owned by the same interests that own the traction company, has purchased the Red Arrow Bus Line, Inc., operating between Wilmington and Marcus Hook, Pa. Mr. Wilson said that as soon as arrangements could be perfected through bus service on a frequent schedule would be operated between Wilmington and Chester.

An increase to 10 cents single fare and 7½ cents by book and 6 cents for school children is to be put into effect by the City Transit Company, operating the local bus service in Pomona, Cal. The bus company lost much money during six months operation and threatened for a time the abolishment of the service. Following several years of operation at a considerable loss the Pacific Electric Railway was allowed last year to discontinue electric railway service entirely in Pomona, following which the City Transit Company undertook to render a bus transportation service.

The application of the Audubon Motor Bus Transportation Company of Yonkers, N. Y., for modification of an injunction which prevents it from operating on Central Avenue, Yonkers, was denied on June 19 by Supreme Court Justice Arthur S. Tompkins. Two months ago the Yonkers Railroad got the injunction against the bus company, alleging that it held exclusive franchises for operation on Central Avenue. In its petition the Audubon company sought permission to run buses only for members of the Central Taxpayers and Improvement Association of the Ninth Ward of Yonkers. The company asked for permission to operate only two buses in the morning and two in the evening. Members of the association joined in the petition. Justice Tompkins ruled that any modification of the injunction would work an unnecessary hardship on the electric railway.

The New York State Railways has added another link to its rapidly expanding bus system in western New York by the purchase of the Rochester-Holcomb line from Joseph H. Haf, Detroit. The line is to be extended to Penn Yan, 60 miles south of Rochester and in the heart of an extensive dairy and grape belt. The Haf interests have operated between Rochester and Holcomb for the past few months following purchase of the line from the Iroquois Motor Trails Corporation.

The Geneva, Seneca Falls & Auburn Railroad is considering supplanting its Geneva-Seneca Falls, N. Y., electric railway line with buses. Paving improvements in the village of Waterloo are said to have precipitated this scheme. The railway, it is declared, has been a losing venture for several years under the present operation.

Permission to extend its service by operating a bus line between Cincinnati, Ohio, and Indian View is sought of the Ohio Public Utilities Commission by the Cincinnati, Milford & Blanchester Traction Company. The bus line would connect downtown Cincinnati with the company's traction lines at Indian View.

The bill passed by both houses of the Legislature to give the Wisconsin Railroad Commission the right to order railways to operate buses in place of street cars has been vetoed by Governor Blaine. In his veto message he maintained that if the bill in question became a law it would make bus transportation practically a monopoly under regulation by centralized authority.

The bus line now being operated by the Philadelphia Rapid Transit Company, Philadelphia, Pa., from the Navy Yard to Broad Street and the Boulevard was extended recently to Broad Street and City Line. This extension has been made possible by the delivery of additional new double-deck buses. The fare for the entire trip, a distance of more than 13½ miles, is 10 cents, with the privilege of exchanging to and from all connecting surface car lines for an additional 3 cents. The buses are of the semi-inclosed top type, seat 67 passengers, are equipped with front exit, inside stairway and electric drive.

News Notes

One-Man Cars Meet Emergency.—Officers of the New York State Railways in Syracuse report that the experiment of running one-man cars on Sunday on the Salina Street route, the busiest in the city, was successful in its initial test and will be in force indefinitely. B. E. Tilton, vice-president and general manager, said eleven one-man cars were substituted for a like number of full-crew cars throughout the day, giving adequate service.

Fare Schedule Under Consideration.—The Illinois Power & Light Company, operating the Quincy railway system, apparently faces a fight in the Council to secure approval of its proposed tariff increases. The resolution and schedule of fares, referred to in the ELECTRIC RAILWAY JOURNAL, issue of June 20, page 993, was laid over for consideration with an evident spirit of opposition among the Councilmen. The difference in fares for street cars and the buses the company proposes to establish brought some censure. A 10-cent cash fare with five tickets for 35 cents and $1 books of 40 tickets for children are basic rates proposed by the traction system.

Fares Increased.—Fares were increased from 7 to 10 cents on the lines of the Cedar Rapids & Marion City Railway, Cedar Rapids, Iowa. This announcement was made recently by the City Council after Chicago auditors had reported on the audit of the books. It showed that unless the fares were raised the company would have a $35,000 deficit at the end of the year. Under the new rate the company will show a balance of $20,000, enough to pay a 5 per cent dividend, at the end of the year, it is claimed.

Wage Increases Provided.—The Chicago, Aurora & Elgin Railroad, Aurora, Ill., has signed a new two-year contract with its employees providing for wage increases for nearly every group. An increase of 2 cents an hour this year for trainmen and an increase of 1 cent again in 1926 are provided. This makes the new scale 74 cents for 1925 and 75 cents for 1926. No changes were made in working conditions.

Court Sustains Commission's Order.—Judge Mann in Circuit Court recently sustained an order of the Arkansas Railroad Commission forbidding the Fort Smith Light & Traction Company from abandoning 1 mile of its line from Van Buren, Ark., to the Falcon Zinc & Smelting Company mine. Van Buren is only a few miles from Fort Smith.

Champions in First Aid.—The first aid team of the Chicago Rapid Transit Company, Chicago, Ill., won the state championship in competition with five other public utility teams on June 19 for the second successive time. It was the second annual championship contest held under the auspices of the Chicago chapter of the American Red Cross. The winner had an average of 99.20 per cent for the five problems. The training of the champions was under the direction of Dr. Hart E. Fisher, company surgeon.

Eight Cents in Leavenworth.—Authority for the Kansas City, Leavenworth & Western Railway to charge 8 cents fare in Leavenworth, Kan., was granted in an order handed down recently by the Public Service Commission. The old rate was 5 cents. The buses are charging 8 cents. Now the street car fare also is 8 cents, two tokens for 15 cents.

Franchise Changes Awaited.—The Greater Cleveland Transportation Commission is expected to report within the next few weeks recommending changes in the Cleveland Railway franchises as they affect the operation of the company's lines in the city of Cleveland and in Lakewood, East Cleveland and Cleveland Heights, Ohio.

Freight Lines Started.—Three electric railway companies, the Pittsburgh, Harmony, Butler & New Castle Railroad, the Pennsylvania & Ohio Light & Power Company and the Northern Ohio Traction & Light Company, have inaugurated a trolley freight line from Pittsburgh to Cleveland and intermediate points. The roads will compete with railroad freight service.

Mayor Wants "City" Parking Fairly Tried.—Protests from retail merchants over parallel parking in the downtown district of Oklahoma City, Okla., have not swerved Mayor Cargill in his determination to ascertain its effect on the traffic problem. Observation and investigation by representatives of the Oklahoma Railway reveal the fact that in practically no city of importance in the country is the 45-deg. angle parking permitted on streets where electric railways operate. The receivers of the company urged the city officials to try out the parallel parking plan, and an experiment for two weeks reveals that while under the old plan there were from two to five accidents daily due to automobiles backing out from the curb in front of street cars, there has been a complete absence of such accidents with the parallel parking.

Insurance on Employees.—The Cleveland Railway, Cleveland, Ohio, has placed group insurance on approximately 5,000 employees with the Travelers' Insurance Company. Those in service from six months to one year are insured for $750, from one to two years, $1,000, increasing $100 each year until a maximum of $2,000 is reached, after eleven years of service. The company bears the entire expense.

Railway Expansion in Tulsa Under Way.—Expansion of lines of the Oklahoma Union Railway in several directions from Tulsa is reported. Construction eastward is progressing at a good rate, with promise of continuous work until the Tulsa fair grounds and Mohawk Park are linked up with the city. At present the only difficulty in sight is a lack of right-of-way for a section of the route to Dawson. The next destination is Mohawk Park, which will be approached from the eastern side. The company has already agreed to establish bus service in that direction. The rail line will afford another connection with the Santa Fé road and take in a new freight territory. Beyond Mohawk the plans are not announced.

Financial and Corporate

$54,965 Balance at Indianapolis

Revenue from Increase in Fare Disappointing—Company Eighteen Months in Arrears in Dividend Payments

The Indianapolis Street Railway, Indianapolis, Ind., reports a balance of $54,965 for the year ended Dec. 31, 1924, after the payment of all expenses, bond interest, sinking fund and $300,000 in dividends. This fact and others were made public following the annual meeting of the company on June 10. Included in the passenger receipts for 1924 is $122,910 derived from increased fares beginning May 21, 1924, all of which sum was expended for special maintenance and the improvement of the service, in accordance with the order of the Public Service Commission. There is also included in passenger receipts $24,971 from Broad Ripple service begun Sept. 1, 1924, and $1,103 bus service north of 34th Street started Dec. 4, 1924. While there was a total increase of $202,341 in revenue passenger receipts during the year 1924, there was a decrease of $133,761 in transfer receipts due to the charge for transfers being reduced from 2 cents to 1 cent beginning May 21, 1924, and a decrease of $7,534 in miscellaneous earnings, making the total increase in gross receipts $61,045.

The revenue derived from increased fares, effective May 21, 1924, namely, 7 cents cash and four tickets for 25 cents, with an extra charge of 1 cent for each transfer, as compared with the previous fare of 5 cents and 2 cents for each transfer, has been much less than anticipated. It was estimated that the increased fares would produce about $500,000 a year additional revenue, all of which would be set aside in a special fund and expended for the improvement of the service. From May 21 to Dec. 31, 1924, the revenue from increased fares over 1923 was $122,910, or an average of about $16,800 a month. From Jan. 1 to April 30, 1925, as compared with the same period for 1923, there is no increase, but as compared with 1924 there is an increase of $26,259.

In its order of April 18, 1924, the Public Service Commission of Indiana made the granting of increased fares contingent upon the company extending its city service to Broad Ripple on or before Sept. 1, 1924. Complying with this order the Indianapolis Street Railway on Aug. 14, 1924, leased from the Union Traction Company of Indiana that part of its line connecting with the tracks of the Indianapolis Street Railway at 46th Street on College Avenue and extending north on College Avenue to 63d Street, thence Eastward to Broad Ripple Park and into said park and began the operation of city cars to and from Broad Ripple on Aug. 31, 1924. Under this arrangement frequent city service is afforded residents of Broad Ripple at regular city fares, namely, 7 cents cash, or four tickets for 25 cents with a transfer for 1 cent to any of the city cars, as compared with a former cash fare of 10 cents and ten tickets for 75 cents without transfers.

The company is still eighteen months in arrears in the payment of dividends on its preferred stock. It paid four quarterly back dividends during the year 1924.

In presenting the report the directors said in regard to bus competition:

> Independent bus competition, referred to in the last annual report of the company, continues and some new lines have been added.
>
> The necessity of placing this unregulated type of transportation under proper restrictions was duly recognized and an act was passed at the last session of the Legislature placing buses under the control of the Public Service Commission.
>
> The growth and development of any city depends largely upon a reliable street railway system, which, in order properly to function, must have the undivided patronage and support of the local public.
>
> Whenever it is necessary to supplement the present railway service by the addition of buses, this should be done under the direction and control of the Indianapolis Street Railway. Only by such unified and co-ordinated operation can the best service to the public be rendered.
>
> When this patronage is divided both the city and the company are bound to suffer.

On May 6, 1925, the Indianapolis Street Railway filed with the Public Service Commission a petition for a certificate of convenience and necessity to operate buses over certain streets of the city and such other streets as might be found necessary to provide for adequate city transportation. This matter is now pending.

EARNINGS OF INDIANAPOLIS STREET RAILWAY

Earnings	1924	1923
Passenger receipts:		
City lines	$4,804,890	$4,602,549
Transfer receipts:		
City lines	246,110	379,871
Miscellaneous earnings:		
Track rentals, etc.	537,175	544,710
Gross earnings	$5,588,176	$5,527,131
Maintenance of way and structures	631,201	643,950
Maintenance of equipment	516,272	516,798
Special maintenance expended from revenue from increased fares by order of Public Service Commission	122,910	.....
Total maintenance	$1,270,384	$1,160,748
Operation of power plant	771,997	850,844
Operation of cars	1,616,028	1,594,879
General expenses	425,338	427,887
Total operating expenses	$4,083,749	$4,034,360
Net earnings	1,504,427	1,492,771
Less taxes	384,354	419,868
Net earnings, less taxes	$1,120,072	$1,072,903

DISPOSITION OF NET EARNINGS OF $1,120,072 IN 1924

Deductions—Bond Interest:	
Interest on $4,000,000 Citizens Street Railroad's 5's	$200,000
Interest on $4,774,000 Indianapolis St. Railway 4's	193,947
Interest on $3,699,000 Indianapolis Trac. & Term. Company's 5's	185,072
Interest on $200,000 Broad Ripple Traction Company's 5's	10,000
Interest on trust equipment notes	3,565
Interest on Indianapolis Car Equipment Company, preferred stock	6,650
Interest on notes, etc.	35,871
Total deductions	$635,107
Surplus (exclusive of accrued depreciation)	$484,965
Deduction from Surplus:	
Indianapolis Street Railway Company sinking fund	$70,000
Indianapolis Traction & Terminal Company sinking fund	60,000
Dividends due on $5,000,000 preferred stock	300,000
Total deduction	$430,000
Balance	$54,965

Option Taken on Ottumwa Properties

A deal is pending for the purchase of the utilities at Ottumwa, Ia. Byllesby & Company, Chicago, have given an option until Sept. 1 to Bechtel & Company, Davenport, Ia., to purchase the Ottumwa Traction Company, operating 12 miles of line, and the other Ottumwa utilities included in the local division of the Northern States Power Company. George M. Bechtel of the firm which contemplates making the purchase is president of the Iowa Southern Utilities Company. The investment firm of which he is the head is said to be the largest of its kind in the state.

Foreclosure Proceeding Against Kansas Interurban

The First Trust & Savings Company, Chicago, trustee for the holders of the first mortgage bonds of the Kansas City, Kaw Valley & Western Railway, Bonner Springs, Kan., has brought foreclosure proceedings to have the road sold because of the failure to pay obligations due Aug. 1, 1924. Action on these proceedings was held in abeyance pending the outcome of the suit for restitution instituted by Receiver Jobes of the railway against J. J. Heim, majority stockholder. This issue has now been settled. It involved a transaction carried out shortly before the receivership. Mr. Heim contended that in good faith and for a valuable consideration he turned over to the company $212,500, par value, in second mortgage bonds, $47,500 in second mortgage coupons and an option for the purchase of one-half interest in the Kansas-Missouri Terminal Company. The option, however, never was exercised by the interurban line. In return he received $224,000 of first mortgage bonds. Mr. Jobes said the transaction would have the effect of making Mr. Heim a preferred creditor, a standing to which he was not entitled. The court has ordered Mr. Heim to return the $224,000 in first mortgage bonds and $6,720 interest on the bonds.

City Begins Its Side in Baltimore Valuation

The United Railways & Electric Company, Baltimore, Md., concluded its testimony during the week ended June 20 in a hearing being held by the Maryland Public Service Commission to fix the valuation of the company's property. Clarence W. Miles, people's counsel, started to call his witnesses immediately. The case is still under way. A recess was taken until June 22.

Following the signing of a petition on the part of the commission the United presented testimony in connection with the issuance of a weekly ticket for $1. Mr. Miles brought this subject into the valuation hearing when he requested the commission to order the United to show cause why it should not put this system into operation. Charles D. Emmons, president of the United, pointed out that if 10 per cent of the riders should use the pass at $1 the revenues for the year would be reduced $500,000. Walter Jackson, Mount Vernon, N. Y., also testified. He pointed out the limitations of the system. Mr. Jackson appeared as a witness for the company.

People's Counsel Miles opened his side of the valuation hearing by declaring that a fair valuation of the United's properties is not more than $55,000,000. This is about $30,000,000 below the minimum figure given by President Emmons during a previous session. The first witness was Harry E. Gilbert, a real estate broker and tax assessor, who dealt with valuation figures on various items. He was subjected to rigid cross-examination by Edwin G. Baetjer and William H. Maltbie, representing the United. Mr. Gilbert placed the reproduction value of the company's buildings at $5,146,618 and from this amount deducted $1,429,728 for depreciation.

Pittsburgh Utilities in New Deal

The Standard Power & Light Corporation of Delaware has been organized by H. M. Byllesby & Company to acquire control of the Pittsburgh Utilities Corporation. It will have authorized capital of 500,000 shares of preferred, 800,000 shares of Class A common and 30,000 shares of Class B common, all of no par value. It is proposed to issue shortly 100,000 shares of preferred, 410,000 shares Class A and 30,000 shares Class B common. The Pittsburgh Utilities Corporation controls the utilities supplying electric power and light, gas, street railway and other services in Pittsburgh, Pa., and adjacent territory.

Ladenburg, Thalmann & Company, New York, and H. M. Byllesby & Company will jointly control Standard Power & Light Corporation. The United Railways Investment Company, which owns nearly all of the remaining voting shares of Pittsburgh Utilities Corporation, will be jointly controlled by Ladenburg, Thalmann & Company and H. M. Byllesby & Company. The latter have acted in this matter also for Standard Gas & Electric Company, which will have a substantial investment in both situations.

New Company to Hold Virginia Properties

Stone & Webster, Boston, Mass., and their associates have organized the Engineers Public Service Company, under the laws of Delaware, to acquire public utility properties directly or through subsidiaries. Through its initial purchase it will acquire more than two-thirds of the common stock of Virginia Railway & Power Company and will have voting rights in respect to a majority of the preferred stock of that company under arrangements whereby it may purchase such preferred stock prior to July 1, 1926, if it so elects. The company will acquire at an aggregate price of about $2,500,000, directly or through a subsidiary, the entire capital stock of Spottsylvania Power Company, a majority interest in coal properties now supplying a substantial portion of the requirements of Virginia Railway & Power Company and valuable water power rights and other properties in this territory. The policy of the company will be to acquire additional public utility properties when obtainable on advantageous terms. Several other properties are under consideration for purchase. Securities of the new company were offered for subscription on June 25.

Approval of South Shore Deal Asked

Preliminary plans for acquiring control of the Chicago, Lake Shore & South Bend Railway, better known as the South Shore Line, by the Midland Utilities Company, of which Samuel Insull is president, were taken in Chicago on June 24. A petition was filed with the Illinois Commerce Commission by the Chicago, South Shore & South Bend Railroad, a newly organized corporation, asking for authority to buy the property of the South Shore Line at the public sale to be held at Gary, Ind., on June 29. Authority was asked also for the issuance of securities to finance the purchase.

A petition seeking similar authority has also been presented to the Indiana Public Service Commission. As the railroad operates in both states, authority must be obtained from both commissions.

The Illinois Commission was asked to authorize the newly organized company to bid not to exceed $6,474,843 for the property. This is the amount of principal and interest due upon the bonds. The commission was asked to authorize the new company to issue the following securities:

Thirty-year 6½ per cent first and refunding mortgage gold bonds with a par value of $2,000,000.

Fifty-year 6 per cent second mortgage gold bonds with a par value of $250,000.

Fifty-year adjustment mortgage gold bonds, with a par value of $1,750,000, bearing no interest during the first two years, 2 per cent during the third year, 4 per cent during the fouth year, and 6 per cent annually thereafter.

150,000 shares of common stock without par value.

The Midland Utilities Company and the present bondholders will be jointly interested in the property after the reorganization. The Midland Company, however, will have a controlling interest and the operation of the lines will be under the management of Mr. Insull and his associates.

The present value of the physical property of the railroad is given in the petition as $5,836,943, exclusive of real estate used by the railroad in Cook County, Illinois.

The railroad has been in receivership since Feb. 28, pending the working out of a reorganization plan by the first lien holders' committee of Cleveland.

Conspectus of Indexes for June 1925

Compiled for Publication in this Paper by

Albert S. Richey
Electric Railway Engineer
Worcester, Mass.

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Street Railway Fares*† 1913 = 4.84	June 1925 **7.27**	May 1925 **7.27**	June 1924 **6.97**	May 1925 **7.27**	May 1922 **6.88**
Street Railway Materials* 1913 = 100	June 1925 **152.4**	May 1925 **153.9**	June 1924 **157.6**	Sept. 1920 **247.5**	Oct. 1924 **148.5**
Street Railway Wages* 1913 = 100	May 1925 **222.4**	May 1925 **222.2**	June 1924 **220.0**	Sept. 1920 **232**	Mar. 1923 **206.8**
Steel—Unfilled Orders (Million Tons) 1913 = 5.91	May 31 1925 **4.05**	Apr. 30 1925 **4.45**	May 31 1924 **3.63**	July 31 1920 **11.12**	July 31 1924 **3.19**
U.S. Bank Clearings Outside N. Y. City (Billions)	May 1925 **17.10**	Apr. 1925 **17.72**	May 1924 **15.93**	Mar. 1920 **18.54**	Feb. 1922 **10.65**
Business Failures Number	May 1925 **1571**	Apr. 1925 **1658**	May 1924 **1739**	Jan. 1924 **2231**	Sept. 1924 **1277**
Liabilities (Millions)	**38.77**	**50.92**	**69.40**	**122.95**	**27.71**

	Latest	Month Ago	Year Ago	Since War High	Since War Low
Eng. News-Record Construction costs 1913 = 100	June 1925 **204.6**	May 1925 **207.2**	June 1924 **216.8**	June 1920 **273.8**	Mar. 1922 **162.0**
U.S. Bur. Lab. Stat. Wholesale Commodities 1913 = 100	May 1925 **155.2**	Apr. 1925 **156.2**	May 1924 **146.9**	May 1920 **247**	Jan 1922 **138**
Bradstreet's Wholesale Commodities 1913=9.21	June 1 1925 **13 62**	May 1 1925 **13.32**	June 1 1924 **12.29**	Feb. 1 1920 **20.87**	June 1 1921 **10.62**
Dun's Wholesale Commodities 1913 = 120.9	June 1 1925 **195.2**	May 1 1925 **193.3**	June 1 1924 **183.8**	May 1 1920 **263.3**	July 1 1921 **159.8**
U.S. Bur. Lab. Stat. Retail food 1913 = 100	May 1925 **151.6**	Apr. 1925 **150.8**	May 1924 **141**	June 1920 **219**	Mar. 1922 **139**
Nat. Ind. Conf. Bd. Cost of living 1914 = 100	May 1925 **165.3**	Apr. 1925 **164.8**	May 1924 **161 4**	July 1920 **204.5**	Aug. 1922 **154.5**

*The three index numbers marked with an asterisk are computed by Mr. Richey, as follows: Fares index is average street railway fare in all United States cities with a population of 50,000 or over except New York City, and weighted according to population. Street Railway Materials index is relative average price of materials (including fuel) used in street railway operation and maintenance, weighted according to average use of such materials. Wages index is relative average maximum hourly wage of motormen, conductors and operators on 100 of the largest street and interurban railways in the United States, weighted according to the number of such men employed.

†Owing to the omission of certain increases in the compilation of this fare index, the figure for average fare, as reported in this Conspectus from October, 1924, to February, 1925, is too low by 0.07 cent. The corrected figures were published on page 635 of the issue of this paper for April 18.

Warren & Jamestown Property Passes to New Hands

As a result of a business transaction between the Niagara, Lockport & Ontario Power Company and the Penn Public Service System, control of the Warren & Jamestown Street Railway and the Carrol Electric Light & Power Company passes from the hands of the Penn Public Service Corporation, which property took it over last year, to the Niagara, Lockport & Ontario Power Company. It was decided at the meeting to conduct the business of the Warren & Jamestown Street Railway, a 23-mile interurban between Jamestown, N. Y., and Warren, Pa., as a separate corporation, the stock of which is owned by the Niagara, Lockport & Ontario Power Company. The following officers were elected: H. B. Zimmerman, Jamestown, president; R. S. Hardy, Buffalo, vice-president; H. C. Mather, Buffalo, treasurer; C. E. Sundholm, Jamestown, assistant treasurer and auditor; Warren Tubbs, Buffalo, secretary, and J. F. Kirk, Buffalo, comptroller. Mr. Zimmerman said that the business of the Warren & Jamestown Street Railway would be conducted with the same service and the same personnel, as far as was possible.

Sale of Long Island Electric Railway Ordered

The Long Island Electric Railway, Long Island City, N. Y., operating between Jamaica and Brooklyn, Jamaica and the Belmont racetrack and also from Jamaica to Far Rockaway, has been ordered sold by the Queens Supreme Court before Justice Faber. This action is the result of the foreclosing of a $600,000 mortgage under which the Chase National Bank, the successor to the Hamilton Trust Company, is trustee for the bondholders. Gen. Lincoln C. Andrews was appointed receiver a year ago. The sale is complete and includes all rolling stock, tracks, Cedar Manor carhouse, terminal at Far Rockaway, with all rails, franchises and rights-of-way. State Senator John Karle of Evergreen was appointed referee in the case.

Statistics of Ohio Roads Made Public

Improvements and extensions of service of city railways in Ohio necessitated an increased investment of more than $3,500,000 last year. This is disclosed in a compilation of reports just filed with the Ohio Public Utilities Commission. The exact increase in the total investment of these companies was $3,571,634, bringing the total up to $123,573,233. At the same time taxes and operating expenses increased, the reports show. The total operating expenses were $31,171,325. This is $101,458 higher than the year before. Taxes were boosted by $825,875, bringing the total tax payments to $4,178,230.

Only eight of the seventeen city street railways paid dividends. Last year these lines carried 726,508,833 passengers. Taking the 1920 census as a basis, the number of passenger rides on these lines would be equal to 126 rides for every man, woman and child in the state.

An increase in freight revenue of almost $500,000 is one of the outstanding features of the combined annual reports of interurban railways in Ohio. This reveals that city shippers and farmers are gradually turning to the electric interurban for quick freight service. An increase in the total investment of these companies for the year was $21,703,230, the new money being needed for freight equipment, buses and extension of electric light and power lines operated by the electric railways.

The total investment of the interurbans at the first of the year was $234,337,969. Taxes paid were $2,432,277, or $46,774 each week. There were 60 interurban railways in the State, operating a total of 2,708 miles of track.

Holmesburg Line Sold.—The receivers of the Frankford, Holmesburg & Tacony Street Railway, Philadelphia, Pa., sold on June 19, for $350,000, its equipment, tracks, franchise and real estate. The bid of John Gilpin, who acted for the bondholders' protective committee, was accepted. It was the minimum offer under order of sale issued by the Court of Common Pleas. The sale was a matter of form to clear away the receivership, it was stated, in advance of the city-P. R. T. agreement as to purchase and operation of the line as part of the Philadelphia Rapid Transit system, in which the city is a partner.

Property Formally Transferred.—Property at Third and State Streets purchased several years ago by the Buffalo & Lake Erie Traction Company in the name of A. F. Tideswell, treasurer of the company, was recently formally transferred to the Erie Railways, Erie, Pa., successor to the old Buffalo & Lake Erie Traction Company. The property was included in the purchase of the traction company property last year but the transfer had not been formally made.

Partial Abandonment Allowed.—The Public Service Commission has approved the abandonment by the New York & Stamford Railway of that part of its lines in Rye located on Purdy Street and that portion of the Boston Post Road from Purdy Street to Peck Avenue and in Peck Avenue. There was no opposition to the proposed abandonment.

Seeks to Abandon Line.—The Chautauqua Traction Company has petitioned the Public Service Commission for permission to abandon that part of its line between Mayville, N. Y., and Westfield, about 9 miles, and to connect its line with the Jamestown, Westfield & Northwestern Railroad at the Pennsylvania Railroad station in Mayville. Both the Chautauqua Traction and the Jamestown, Westfield & Northwestern lines are controlled by the same management.

Sale of Properties Proposed.—In a petition filed with the Public Service Commission at Salem, Ore., on June 17, H. D. Wagnon, Portland, proposed the purchase of the railway properties of the Portland Electric Power Company by the city of Portland. He urged the reduction of fares from 8 to 5 cents, extension of transfer privileges and liquidation of the annual deficit by the taxpayers of the municipality. The petition further urged that patrons of the railway be allowed to intervene in the action brought by the housewives' council of Portland to obtain lower fares on the lines of the defendant corporation. The petition of the housewives' council will probably be heard by the commission by July 1.

Tractions Display Strength on Indianapolis Exchange.—A display of strength of various interurban and street railway securities in Indiana has been noticed lately on the floor of the Indianapolis Stock Exchange. There have been trades in several traction issues, dormant for weeks, bid prices being marked higher than for some months. The rise in quoted prices of traction securities seems to be general.

Declaration on Account of Back Dividends.—The Washington Railway & Electric Company, Washington, D. C., has declared a dividend of $20 on the common, on which payments were passed from March 1, 1919, to June 1, 1923. Out of $6,000,000 impounded by the Utilities Commission pending determination of rates of which $500,000 was set aside for paying federal and district taxes, the railroad received $2,944,222, of which the total amount declared for dividends on the common stock of the company for the years in which dividends were passed amounted to $1,300,000. The dividend is payable on July 1.

Increase in Net Income.—For the eleven-month period ended May 31, 1925, the Brooklyn-Manhattan Transit Corporation, Brooklyn, N. Y., had total operating revenue of $39,550,536, against $36,498,974 for a similar period ended in 1924. Total operating expenses advanced from $24,239,102 to $25,930,098 for the period ended May 31, 1925. After the consideration of income deductions net income this year was $4,643,080, against $3,518,522 for the eleven-month period ended May 31 of last year.

New Directors at Jamestown.—William A. Broadhead, Frank E. Gifford, Fletcher Goodwill, Homer M. Preston, William R. Reynolds, William A. Broadshaw, George E. Maltby, George L. Maltby and Robert H. Jackson comprise the new board of directors of the Jamestown Street Railway, the Chautauqua Traction Company, Jamestown, Westfield & Northwestern and the Jamestown Motor Bus Transportation Company. Members of the board never previously associated with the Broadhead traction interests in Chautauqua County are Messrs. Goodwill, Preston, Bradshaw and Jackson.

Two-Mile Road to Be Sold.—Complications growing out of the failure of the Huntingdon Bank led to a court order on June 25 for the sale of the property of the Huntingdon, Lewistown Juniata Valley Traction Company at Huntingdon, Pa., on July 27. Default by the company in the payment of semi-annual interest due on a mortgage held by the bank's assignee resulted in the court order. Huntingdon has a population of 8,000. The road consists of 1.75 miles of track. There are six cars.

Personal Items

W. F. Kelly in New Office

Well-Known Engineer Becomes Chairman of the Board of the Chester Valley Lines

William F. Kelly, formerly vice-president of the company, was elected chairman of the board at a recent meeting of the stockholders of the West Chester Street Railway, West Chester, Pa. This company, together with its bus subsidiary, the Peoples Transportation Corporation, the combination being popularly known as the Chester Valley Lines, controls a transportation system serving more than 1,000 square miles in Chester, Delaware and Montgomery Counties in Pennsylvania and the northern portion of Delaware.

Mr. Kelly was graduated from the University of Pennsylvania in 1892

W. F. Kelly

and received a post-graduate degree the following year. He has been engaged in engineering work since then, mostly for railway, electric power and other public utility properties. As assistant engineer with the Union Traction Company in Philadelphia and later as assistant to the chief engineer of the Metropolitan Street Railway System in New York City, his experience has covered a wide field in design and construction of practically all departments of electric railway service.

For fourteen years he was associated with the engineering firm of Ford, Bacon & Davis, New York. He had charge of the construction of much of their important work in Birmingham, Ala., and Memphis, Tenn., Youngstown, Ohio, and other towns in the Eastern, Southern and Middle States. He also was engaged in special investigations, valuations and reports on many of the large utility systems of the country.

Since 1915 he has been a member of the engineering and management firm of Kelly, Cooke & Company, Philadelphia. Most of this firm's activities have been devoted to public utility properties. For it Mr. Kelly has examined and reported on a great number of situations in the United States and been called to appear before utility commissions on matters of valuation, service and rates. In recent years the firm has been doing some notable work in connection with rejuvenation of electric railway properties and the improvement of their public relations.

The development of the Chester Valley Lines, which is controlled and managed by Kelly, Cooke & Company, was described in the ELECTRIC RAILWAY JOURNAL for Nov. 22, 1924.

Appointments at Detroit Announced

Rufus G. Lathrop, a Detroit attorney, has been appointed secretary to the Street Railway Commission at De- the Street Railway Commission at Detroit, Mich. Mr. Lathrop was appointed by the commission upon the recommendation of former Judge James O. Murfin and John C. Lodge, president of the City Council. He succeeds I. N. Merritt.

W. M. Hauser of the Detroit Rapid Transit Commission has been appointed auditor for the street railway department, assuming part of the duties of Mr. Merritt, who was auditor as well as secretary to the commission.

There has been no new appointment to fill the position at the head of the claims department vacated by the resignation of Clarence E. Wilcox. Immediately following the dismissal by the commission of Mr. Schram and Mr. Merritt, the commission received the resignation of Mr. Wilcox, head of the legal division, and H. B. Shelden, chief claims agent. Mr. Wilcox addressed his letter to Mayor Smith, the Street Railway Commission and H. U. Wallace, general manager, asking that his resignation be accepted to take effect immediately.

The duties of the head of the claims department are now being carried out by the Corporation Counsel's office, which is headed by Charles P. O'Neil. A. L. Barkey of the city staff has been placed in immediate charge.

Mr. Wilcox, the former head of the claims department, was appointed to that position early in 1924 by acting Mayor Joseph A. Martin. His appointment was contested by Corporation Counsel Richard I. Lawson, as illegal. Mr. Lawson was later dismissed by Martin, and George A. Kelley, who was appointed to succeed him, approved the appointment of Mr. Wilcox.

General Andrews Receives Degree

At the commencement exercises of Trinity College, Gen. Lincoln C. Andrews, Assistant Secretary of the Treasury, receiver of the New York & Queens County Railway, Long Island City, and one of the best-known men in public life in Queens, received the honorary degree of doctor of laws.

Promotions on North Shore

Messrs. Thompson and Fallon Vice-Presidents—J. S. Hyatt in New Office of General Manager

Charles E. Thompson and Bernard J. Fallon were elected vice-presidents and Jesse S. Hyatt was appointed to the new office of general manager and also made chief engineer at a recent meeting of the board of directors of the Chicago, North Shore & Milwaukee Railroad, Highwood, Ill.

The promotion of Mr. Thompson came shortly after the close of his twentieth year of service with electric railways, seventeen of which were spent with the North Shore Line. His first job with the company was chief clerk to the auditor, which also carried with it the duties of paymaster. At that time the line was operated between Evanston and Waukegan.

In 1907 Mr. Thompson was made auditor, but later he served as purchasing agent. In 1915 and 1916 he was general manager. When the line came under the management of Samuel Insull and associates Mr. Thompson

C. E. Thompson

was made assistant to the president. This position he held until the time of his most recent promotion.

Mr. Fallon's service began with the North Shore Line when it came under its present management, he having served previously with the Chicago Rapid Transit Company. His service with the latter company approximates twenty years. He was engineer maintenance-of-way, general manager and for the past year vice-president in charge of operation. He held the position of chief engineer with the North Shore Line at the time of his election as vice-president.

Mr. Hyatt began work with the North Shore Line in 1903 as a rodman during the period of construction of the railroad. Later he was employed by the Grand Trunk Pacific Railroad, but returned to the North Shore Line in 1905. With the exception of two years from 1910 to 1912, when he was employed as secretary and treasurer of the Lake County Telephone Company, he has since served with the North Shore Line. He was engineer maintenance-of-way at the time of the recent election.

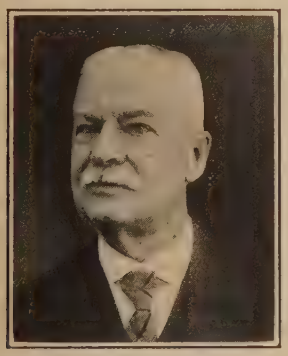
Lincoln C. Torrey, formerly assistant

treasurer, was made assistant secretary in addition at the directors' meeting. Mr. Torrey came to the North Shore Line in 1921 from the Goodyear Tire & Rubber Company in Akron, Ohio. He has served the company as engineer, auditor and valuation engineer in addition to the above duties.

New Personnel in Charge of Broadhead Interests in Jamestown

Homer M. Preston has been elected president of the Jamestown Street Railway, the Chautauqua Traction Company, the Jamestown, Westfield & Northwestern Railway and the Jamestown Motor Bus Transportation Company, all of Jamestown, to succeed the late Almet N. Broadhead, who controlled all of these companies. While separate corporations will be continued, the traction and bus lines will be operated under one general management, and the officers and directors of the companies will be identical.

Mr. Preston formerly was a director and vice-president of the Warren-Jamestown Street Railway, in which



G. E. Maltby

capacity he served many years. He also has been associated with the Southwestern Interurban Company, operating in Kansas, and also of the Union Traction Company, Coffeyville, Kan.

George E. Maltby, who has been general manager of the Broadhead traction lines for 40 years, has been promoted to the position of vice-president, with general supervision over all the Broadhead traction system. His connection with the Jamestown Street Railway dates back to the days of horse cars.

George L. Maltby, a son of George E. Maltby, has been appointed general manager of the various traction lines. Until last September he had been superintendent of the lines for fourteen years, but resigned to enter the automobile business. He now returns to the affiliated companies as general manager.

The executive committee in charge of the operation of the properties includes Messrs. Preston, Broadhead and Robert H. Jackson.

Harold Evans has been appointed to the Pennsylvania Public Service Commission.

Many Changes on New Haven

N. M. Rice New Vice-President—C. L. Bardo on Leave of Absence—Other Appointments Made

N. M. Rice, for the last five years general purchasing agent of the New York, New Haven & Hartford System, has been elected vice-president of the company in charge of purchases and stores. Mr. Rice was formerly vice-president in charge of purchasing and stores on the Atchison, Topeka & Santa Fé Railroad.

J. O. Halliday, superintendent of transportation, has been appointed manager of transportation, reporting to the general manager. He will co-operate directly with the freight traffic manager and the passenger traffic manager. Mr. Halliday has been on the New Haven System for a long period.

C. L. Bardo, general manager, having requested leave of absence, the duties and authority of general manager will devolve upon and be exercised by J. A. Droege, general superintendent of the New York Division. He is appointed acting general manager. Mr. Droege in various capacities and at different times has been in charge of operation of all parts of the New Haven System. Mr. Bardo is particularly well known in electrical engineering circles. He was formerly superintendent of the electric division of the New York Central Railroad at New York.

W. H. Foster, general superintendent Lines West, with office at New Haven, has been appointed general superintendent of the New York Division.

E. E. Regan, superintendent of the New Haven and New London Divisions, has been appointed acting general superintendent Lines West.

W. L. Bean has been made mechanical manager to take the place of L. N. Reed, resigned. Mr. Bean went to the New Haven Railroad in 1916 as assistant to Mr. Pearson in his investigation of the property, and in formulating the report and recommendations in accordance with which the program for the improvement of the property was undertaken. In 1917 Mr. Bean was made assistant general mechanical superintendent, and on Nov. 1, 1918, mechanical assistant to the president. He acted in that capacity until Dec. 1, 1923, at which time he was made assistant mechanical manager.

George A. Moriarty, mechanical superintendent Lines East, has been appointed general mechanical superintendent, with office at New Haven.

The title of H. P. Hass, special assistant to mechanical manager, has been changed to assistant to mechanical manager.

F. E. Ballda, assistant to mechanical manager, has been appointed mechanical superintendent Lines East, with headquarters at Boston, vice G. A. Moriarty, promoted.

Kenneth Cartwright has been appointed assistant mechanical engineer in charge of specifications, design, records and standards of equipment.

J. E. Slater, formerly special assistant to the general manager, has been made assistant to the general manager. E. B. Perry has been appointed assistant to the general manager. Mr. Perry has been supervisor of wage schedules. In their new capacities Mr. Slater will represent the general manager in all budget matters and will have charge of the analysis of operating performances and costs, while Mr. Perry will represent the general manager on matters affecting wages, working conditions, and group insurance. The titles of special assistant to the general manager and supervisor of wage schedules have been abolished.

F. V. Underwood General Manager in Knoxville

Fred V. Underwood, for many years associated with electrical interests in Alabama, has just been appointed general manager of the Knoxville Power & Light Company, Knoxville, Tenn. Up to the present time C. H. Harvey has been president and general manager at Knoxville, while H. U. Wallace, recently appointed general manager of the municipal railway at Detroit, for-

F. V. Underwood

merly was assistant general manager of that property. Mr. Underwood will have direct charge of railways and the respective heads of the transportation, mechanical, way and structures and line departments will report to him.

Mr. Underwood entered the public utility field in 1900 in the employ of the Consolidated Electric Light Company of Birmingham. This company later became part of the Birmingham Railway, Light & Power Company, now the Birmingham Electric Company. He continued with the Birmingham properties through their reorganizations to the present time. A practical operating man, he has worked his way through various positions with the Birmingham company to be assistant general manager.

During the World War Mr. Underwood was for a short time connected with the Alabama Power Company as superintendent of production, having charge of its generating plants. His principal attention, however, was given to the operation of the Gorgas plant, where construction work was rushed in order to furnish power for nitrate plants at Muscle Shoals.

Manufactures and the Markets

News of and for Manufacturers—Market and Trade Conditions
A Department Open to Railways and Manufacturers
for Discussion of Manufacturing and Sales Matters

Increasing Efficiency in Production

Manufacturing industries are making astonishing progress in efficiency, recent calculations show. Production of manufactured goods in 1923 was 65 per cent greater than that of 1914. The increase in personnel was only 25 per cent. While some other factors enter into the comparison, the principal causes responsible are held to be increased efficiency in management, an increase in the skill of workers and the increased use of machinery. The entire increase in personnel was among the wage workers. Apparently it has been found possible to increase output without increasing the staff.

High prices of materials and high wages have stimulated efficiency. When the railroads were paying 75 cents a ton for coal, for instance, they paid little attention to its conservation. Subsequent high prices of the fuel, however, stimulated its more efficient use.

The systematic effort to stimulate efficiency and sensible conservation has been known as the program for the elimination of waste in industry. The term is not regarded as a satisfactory one, as it conveys to the public an implication of willful waste.

Demands for Space Unprecedented

Previous records of requests for space at the October convention have all been broken. To the close of business June 23, 139 companies had applied for 76,689 sq.ft. The similar date last year shows that 91 companies had applied for 47,810 sq.ft. The increase is 48 applicants and 28,879 sq.ft.

The exhibit committee will assign space on July 1. All applications received up to the close of business June 30 will have the committee's attention at this meeting.

Should any space remain after the initial allotment has been made, it will be assigned by the director of exhibits in the order in which applications are received.

Patent Office Situation Is Improving

Greater liberality on the part of Congress in the matter of appropriations has improved the Patent Office situation somewhat, but it is recognized that the trouble is not all due to lack of funds.

Means of improving practice on the administrative side now are being considered. One way would be to relieve the Commissioner of part of his judicial functions. To this the patent lawyers object. They seem to think the present cumbersome appeal machinery is necessary. A question raised by the examiners, under present procedure, can be appealed to a board of examiners, then to the Commissioner, then to the Supreme Court of the District of Columbia, then to the Court of Appeals, and finally to the Supreme Court of the United States. Some think "six jumps to justice" are too many.

Other industrial countries require the commercial production of the article patented within certain time limits. This makes it necessary for American inventors to start manufacturing plants all over the world. On the other hand, Germany and England, for instance, by taking out patents here can prevent manufacture in this country. Equality of treatment to American inventors will be sought at The Hague.

Chicago "L" Rushing Improvement Plans

Word has been received by the Chicago Rapid Transit Company that the first of the 100 additional steel cars, recently ordered, will arrive about July 1. All of these new coaches are expected to be in service by Oct. 1. They are under construction in the shops of the Cincinnati Car Company, and are the same as the modern plush-seated steel cars recently placed in service, except that motors and running equipment have been improved.

Rolling Stock

New York, New Haven & Hartford Railroad, New York, is in the market for 50 buses as equipment for its new motor transportation subsidiary, the New England Transportation Company. All equipment to be ordered at present will be for passenger business, and bids will be asked of several manufacturers.

Coast Cities Railway, Asbury Park, N. J., recently placed in service on its line between Asbury Park and Long Branch, N. J., seven light-weight, double-truck, one-man, two-man cars built by the J. G. Brill Company and referred to in the ELECTRIC RAILWAY JOURNAL, issue of Jan. 10, 1925. The new cars are equipped with automatic safety devices, air-operated sanders, and electric motorman signal system. Trucks are of the Brill lightweight No. 77-EX type, 5 ft. x 4 in. wheelhase and equipped with 26-in. diameter wheels. Quadruple 35-hp. motors are mounted on these trucks. Doors on both sides of each platform are of the double two-part folding type pneumatically operated. The seating capacity is 40. All seats are upholstered in brown imitation leather. Interior woodwork is of cherry stained mahogany. Agasote is used for headlining and also for the inside lining below the window sills.

Track and Line

Hull Electric Company, Hull, Que., contemplates paving about 1,000 ft. with concrete and asphalt on Laurier Avenue and Hotel de Ville Street.

Morris County Traction Company, Morristown, N. J., is to seek permission in the United States District Court at Newark to spend between $135,000 and $140,000 for improvements to its tracks in Dover, Madison and Chatham. It is estimated by the company that 30,000 sq.yd. of paving will be required for the three municipalities. Preliminary arrangements with the State Highway Commission were disposed of recently and the necessary formalities attended to by the company's receivers.

Chicago, North Shore & Milwaukee Railroad, Highwood, Ill., is eliminating two right-angle curves in Milwaukee by means of a diagonal right-of-way through two city blocks from the start of one of the curves to the end of the second. The new route is so short that it will not materially reduce the running time, but it will make for safer operation. It is expected that the new track will be in use early in July.

St. Johns Electric Company, St. Augustine, Fla., is extending its line to the beach, which has been cut off from trolley communication with the city for about three years. The present track is being relaid far enough inland to make it safe, as the old track had been washed out in one of the fall storms.

Trade Notes

Hynes & Cox Electric Corporation, Albany, N. Y., is doing work along industrial heating lines and expects to follow up shop and power house possibilities in the railway field. Lee P. Hynes, the president of the corporation, formerly was consulting engineer for the Consolidated Car Heating Company. Theodore M. Cox is vice-president and treasurer of the Hynes & Cox Electric Corporation.

Economy Electric Devices Company, Chicago, Ill., has received an order to equip the Atlanta property of the Georgia Railway & Power Company with Economy meters having dials for car inspection on the kilowatt basis. This job will total 300 meters.

Metal, Coal and Material Prices

Metals—New York	June 23, 1925
Copper, electrolytic, cents per lb.	13.625
Copper wire base, cents per lb.	15.50
Lead, cents per lb.	8.20
Zinc, cents per lb.	7.33
Tin, Straits, cents per lb.	56.50
Bituminous Coal f.o.b. Mines	
Smokeless mine run, f.o.b. vessel, Hampton Roads, gross tons	$4.275
Somerset mine run, Boston, net tons	1.975
Pittsburgh mine run, Pittsburgh, net tons	1.95
Franklin, Ill., screenings, Chicago, net tons	2.125
Central, Ill., screenings, Chicago, net tons	1.775
Kansas screenings, Kansas City, net tons	2.625
Materials	
Rubber-covered wire, N. Y., No. 14, per 1,000 ft.	$6.25
Weatherproof wire base, N.Y., cents per lb.	18.00
Cement, Chicago net prices, without bags	2.20
Linseed oil (5-lb. lots), N.Y., per gal.	$1.05
White lead in oil (100-lb. keg), N. Y., cents per lb.	0.1575
Turpentine (bbl. lots), N.Y., per gal.	$1.03

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Associate Editor

Vol. 65
No. 26

Pages
1001-1036

June 27, 1925

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Car Riding Increased 28 per Cent 1003

New Brooklyn cars increase schedule speed due to better acceleration and retardation and decreased loading time. Lesser weight and better schedules reduce energy consumption. Other features are incorporated in last cars delivered.

Handling Freight on Aroostook Valley Line 1007

New 60-ton electric locomotive recently built for this service has interesting features. Severe winter weather presents an operating problem.

Automatic Derail Protects Steep Grades 1008

Time lag of ten seconds between making connection at the contactor and operation of the switch necessitates cars coming to a dead stop.

Electric Railways Keep Pace in Rapidly Growing Texas Cities 1009

BY CHARLES GORDON.

Local street railway lines and interurbans have played an important part in the development of Houston, Dallas, San Antonio and Fort Worth. A spirit of co-operation has been built up by close attention to the public demands. Buses are operated by railways in Houston and San Antonio.

Sand Outlets Attached to Trucks on Interurban Cars 1014

"Crimson Limited" Gives Attractive Interurban Service 1015

Northern Texas Traction Company improves cars for Fort Worth-Dallas, non-stop service with a special view to merchandising. Combination of colors used to give streamline effect.

Experience with Surface Hardened Rail in Toronto 1016

Association News and Discussions 1017

United States installations small, although comprising 25 per cent of world's total. Standardization of system considered essential. Electric railway men among new officers of the association.

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Saving Your Time

ONE of the most important features of any business paper is its reference value to its subscribers. The staff of ELECTRIC RAILWAY JOURNAL is always willing to locate articles for its readers. Many requests of this kind are received and all are given prompt attention, but at best some time must elapse before the answer can reach the inquirer. Even the shortest delay may mean considerable inconvenience to the person waiting for information.

Accordingly the publishers have placed at the disposal of each reader the means of locating articles for himself in a minimum of time. Each week the articles are listed in the contents, and twice a year at the close of the volume a complete subject index is published. The index for Vol. 65 is complete in this issue. The subscriber is thus enabled to have his volume bound complete with the index immediately thereafter.

In case the reader does not bind the volumes but files the issues for future reference, the indexes may be placed conveniently at hand and thus be readily available for reference should it be desired to locate any particular article. Reference to the table on the first page of the index indicates the date of the issue in which a given page number was published. Complete instructions are also given on how to use the index.

The value of the JOURNAL index is in the time it saves and the inconvenience it eliminates for the reader.

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Low Maintenance

THE installation of Westinghouse HOLLOW-SPUN reinforced concrete poles for telegraph, trolley and transmission lines, WILL REDUCE your maintenance costs, because:

—reinforced concrete poles are stronger and have a much longer life than poles of wood or iron

—by increasing the pole capacity they reduce the number of poles per mile, without reducing the safety factor

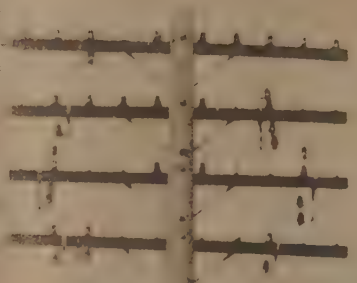
—they are free from electrolytic corrosion, since the concrete in the spun poles is much more dense than it is possible to secure in concrete poles made by hand methods

—street and highway lighting equipment may be mounted on HOLLOWSPUN trolley poles; thus increasing their utility value without additional investment

—these poles are made in five standard classes, grouped according to guaranteed strength, which makes it possible to select the proper pole after the actual computed stresses for the line under consideration have been figured

—Leaflet 20254 gives interesting data about HOLLOWSPUN concrete poles. Write for it TODAY!

Westinghouse Electric and Manufacturing Company
George Cutter Works
South Bend, Indiana
Sales Offices in All Principal Cities of the United States and Foreign Countries



Westinghouse

X 81758

The Modern Light-Weight Electric Street Car
The Hub of the Industries Service

It is the only solution for city transportation and street congestion problems

Rapid Acceleration

Comfort and Convenience

When the Traffic Officer says "Go"

the modern light-weight car leads the vehicular procession over the crossing to the next traffic point.

Powered with four Westinghouse motors, every wheel is working to push the car forward. The acceleration of the car is not only rapid but smooth, due to the carefully-designed control and rheostat.

The interior of the car is pleasing; the atmosphere is ventilated and the passenger, in a comfortable seat, may read the day's paper.

The motorman prefers rapid acceleration because it assists him to keep on schedule time in congested traffic.

Operating companies that have adopted these cars know this type of car, on any property, means better operation and increased net earnings.

Ask the Westinghouse representative for further information.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of
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MEMBER AERA ELECTRIC RAILWAYS ASSOCIATION

Increased Patronage

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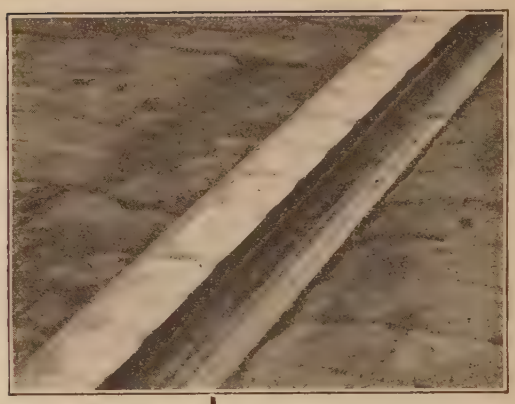


The cost of removing these corrugations is least with RECIPROCATING GRINDERS

Get Cost Figures Right

THE actual total cost of removing corrugations, with due consideration for the kind of results obtained, will invariably work out in favor of the "RECIPROCATING" GRINDER.

WHY?

First, because it does the work thoroughly and completely where corrugations are deep. Its work can be concentrated at any given spot and corrugations removed completely.

Second, it does the work rapidly, and no less thoroughly where corrugations are light.

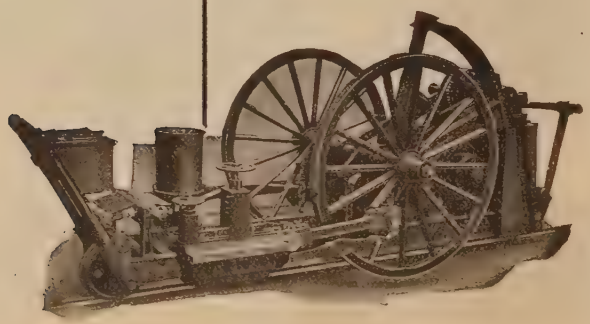
Third, it does not waste time and rail material running back and forth over track where corrugations have not yet appeared.

Fourth, it can be operated by track laborers at track laborer's day-time wages—no night overtime or high-priced men to pay. It does not interfere with traffic.

Fifth, rail-head is re-shaped to its original contour, clear over to the gage line.

Figure Costs Right

What you want is lowest cost per foot of actually corrugated rail ground perfectly smooth—*not* merely low cost per foot of total trackage passed over, *nor* merely low cost of partly removing corrugations. There is a big difference. Figured accurately, cost of removing corrugations is always lowest on the many roads which depend upon and use their Reciprocating Grinders. Would you like further data?



Railway Track-work Co.

3132-48 East Thompson Street, Philadelphia

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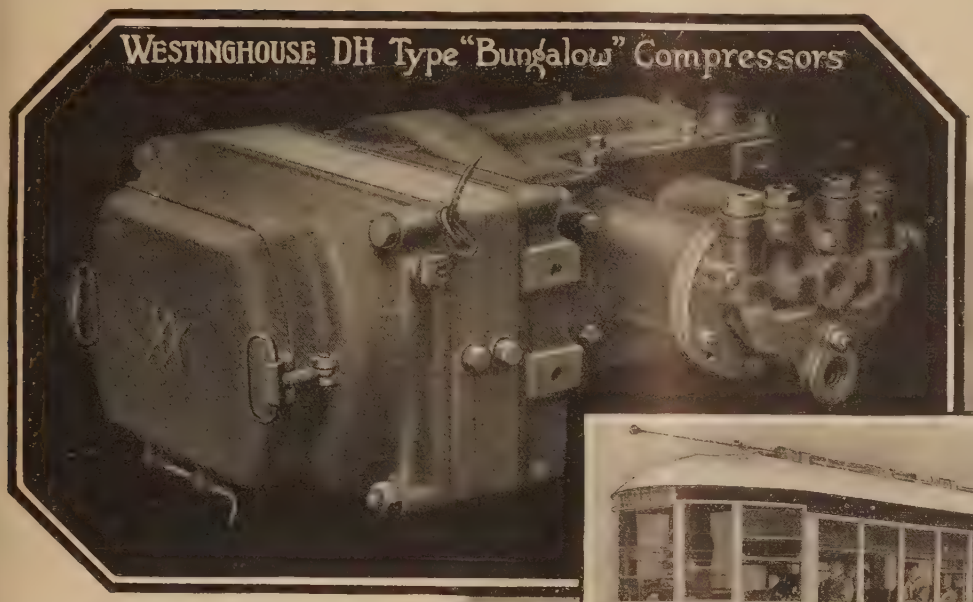


Properly Constructed for Low-Built Cars

EASY TO GET AT

DH Compressors are highly popular with maintenance men owing to the quick and easy manner in which access may be gained to all parts. This feature encourages regular and careful inspection.

Many cars being constructed today are of the low-floor type, and for such cars the DH Compressor was "made-to-order."

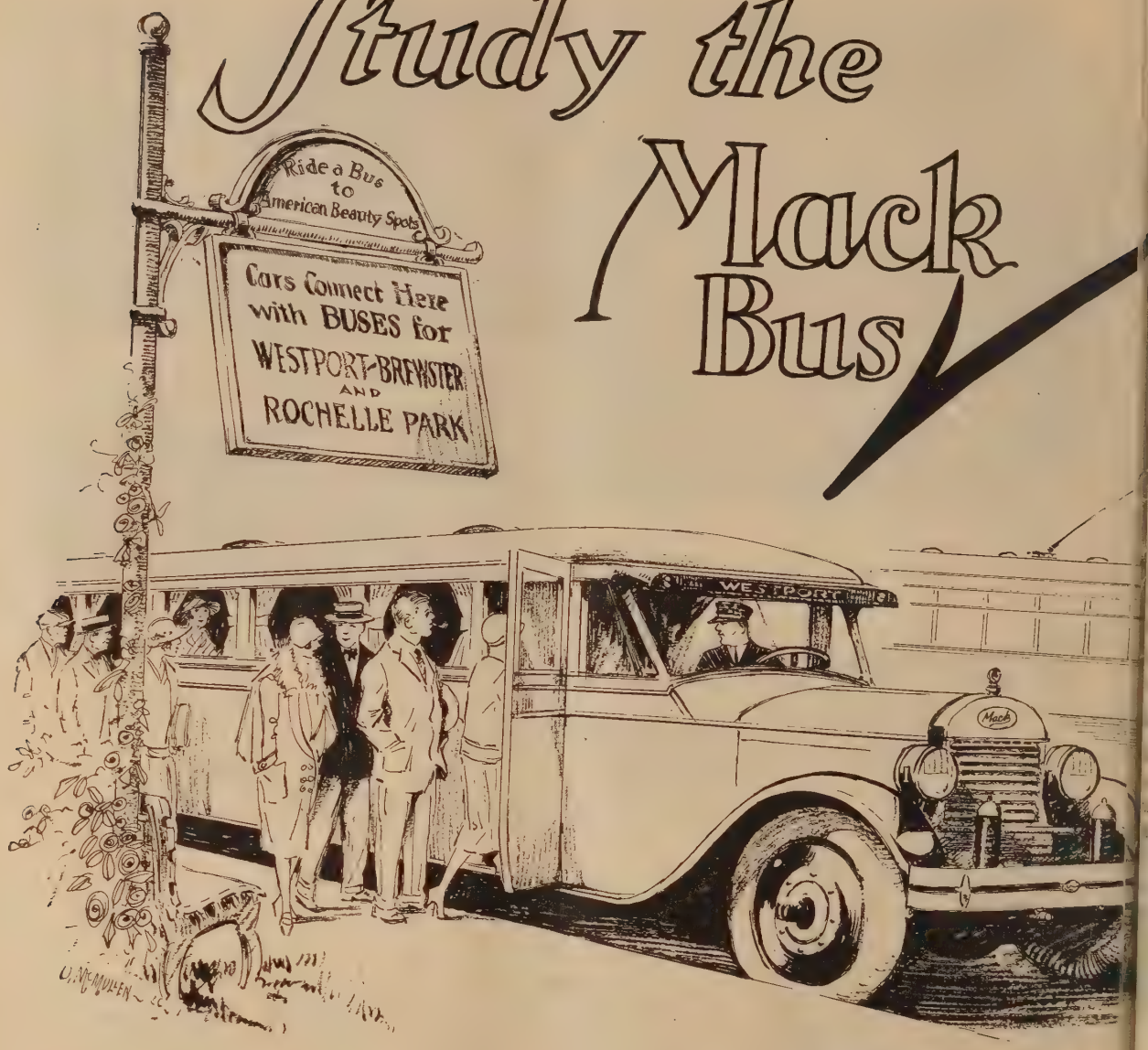
In addition to fitting snugly in small spaces and providing ample track clearance for the lowest cars, DH Compressors offer a degree of mechanical perfection which appeals to the cautious buyer with an eye to steady, dependable service, long life and low maintenance cost.

The "Bungalow" Compressor is built in sizes suitable for all classes of traction service—of the same general design and properly constructed for low-built cars.

Westinghouse Traction Brake Company
General Office and Works: Wilmerding, Pa.

WESTINGHOUSE TRACTION BRAKES

Study the Mack Bus



as a key to the profitable "summer traffic" field

THE call of the great out-doors invites tourists and pleasure-seekers to ride buses.

The bus route is the scenic route. The winding ribbon of highway beckons, slipping smoothly between hill and valley. Glimpses of sun-lit spots and cool shadowed nooks flash by. And relaxing in a comfortable seat, the passenger who rides in a Mack Parlor Car Bus mentally thanks the electric railway that places such service at his disposal.

The call of the great out-doors is a call to railways to increase revenue and build good-will by extending bus service to the garden spots of recreation adjacent to their routes.

Unquestionably, Mack Buses are a logical choice when it comes to deciding on equipment.

Mack has the all-bus chassis.

Mack has the Shock Insulator Suspension whereby all spring ends are embedded in cushions of live resilient rubber, which effectively absorbs all minor crystallizing road shocks.

Mack has the famous improved Mack engine, and a score of other features that contribute to passenger comfort and operating economy.

Chapter 7 of Bus Operation Practice; the Mack 200-page manual of bus operation, treats in detail with the question of promoting summer and feeder traffic. You can secure a copy by communicating with the nearest Mack Branch or direct with our general offices at 25 Broadway, New York.

How about getting a first-hand picture of how a Mack bus will operate over your route? Your nearest Mack branch will gladly arrange to take care of you with a demonstration. Why not call up and set a time?

MACK TRUCKS, INC.
INTERNATIONAL MOTOR COMPANY
25 Broadway, New York City

Eighty-eight direct MACK factory branches operate under the titles of "MACK-INTERNATIONAL MOTOR TRUCK CORPORATION" AND "MACK MOTOR TRUCK COMPANY"

The Mack Bus

The Lehigh Valley Traction Company of Allentown, Pa., recently purchased thirteen 25-passenger City Type buses similar to the one illustrated. Ten of these will be used on feeder lines to their present service in Hazleton, Pa., and the other three will be operated between Bethlehem and South Bethlehem.

—Mack Standard Types—
City Bus 25 passenger.
City Bus 29 passenger.
Parlor Car Bus.
Sedan Bus.

Performance counts!

It is a Safety Car if equipped with our standard Safety Car Control Devices.

GRAND RAPIDS

"Innovations" all have *Standard Safety Car Control*

Safety Cars have been operating long enough in Grand Rapids to demonstrate the advantages of this type of transportation—the one-man-operated car properly protected by labor-saving and safety elements, as embodied in the Safety Car Control Equipment—and 70% of the service is of this type. Contemplated purchases will bring this up to 90%.

Although the three sample light weight cars recently put into service by this company differ radically from previous types of cars in many elements of design and equipment, yet, they all have the standard Safety Car Control—a significant indication of confidence in the equipment that has proved its merits by long and extensive service.

SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.

Postal and Telegraphic Address:
WILMERDING, PA.

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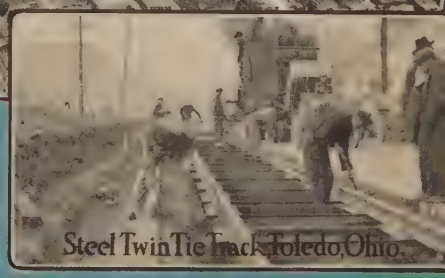
Steel Twin Tie Track on representative and prosperous railways

DETROIT

Twin Tie Track, Detroit, Mich

TOLEDO



Steel Twin Tie Track, Toledo, Ohio.

Big Mileage *in* Big Cities

ıe best evidence of the quality Steel Twin Tie Con- uction is in our list of users and in their records.

May we suggest you designate one of your organization to investigate Steel Twin Ties and report?

KANSAS CITY

I Twin Tie Track, Kansas City, Mo.

PORTLAND

Steel Twin Tie Track, Portland, Ore

The International Steel Tie Company
Cleveland, O.

Steel Twin Tie Track

Renewable Track · · Permanent Foundation

A New Standard for Performance for Paved Track Construction

IN the past two years a new standard of performance for paved street track construction has been set by Steel Twin Tie Track. Several installations are *now older* than the rail they are carrying.

Passing over the original installation illustrated here some 45,000,000 car wheels wore the rail head to a point which necessitated renewal. But the foundation of concrete and steel ties was found in perfect condition.

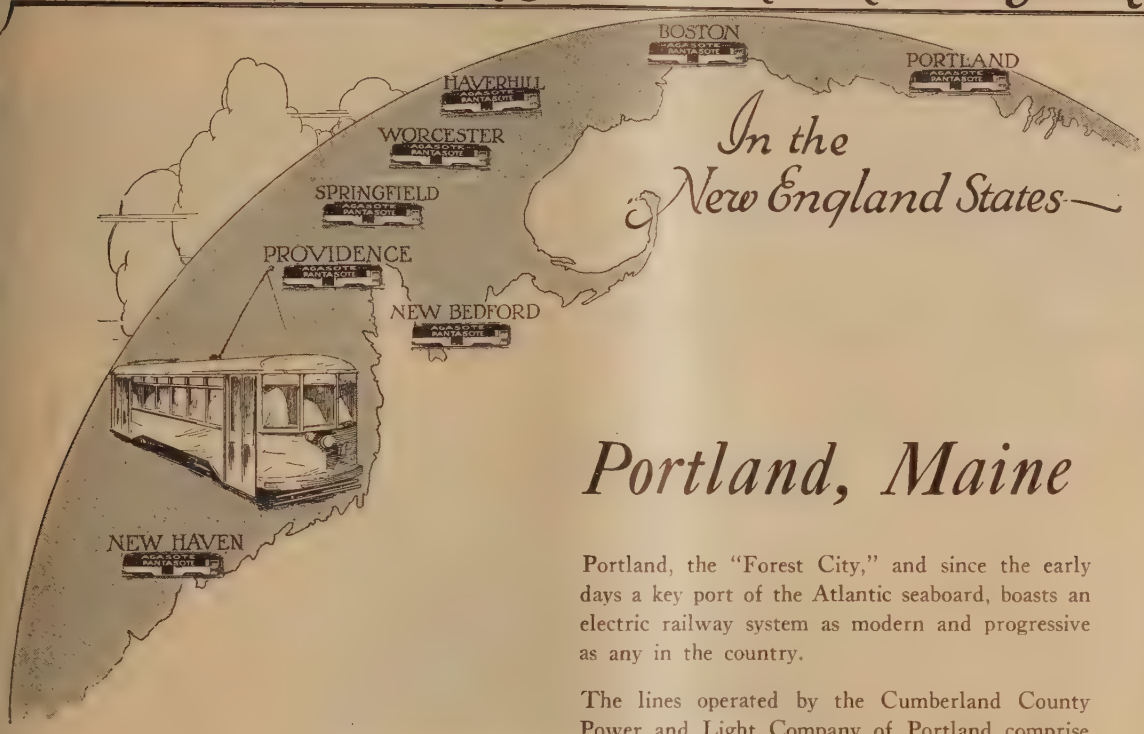
The renewal methods and design for initial installation are described in detail in our new catalog. May we send it to you with a quotation on ties to your point of delivery.

The International Steel Tie Company, Cleveland, Ohio

Steel Twin Tie Track

Renewable Track · · Permanent Foundation

Covering the country with Pantasote and Agasote



Portland, Maine

Portland, the "Forest City," and since the early days a key port of the Atlantic seaboard, boasts an electric railway system as modern and progressive as any in the country.

The lines operated by the Cumberland County Power and Light Company of Portland comprise both city and suburban services aggregating some 105 miles of trackage. And in company with the majority of well-established operators they have from the first consistently specified Pantasote and Agasote.

Judged on the sound basis of proved last cost economy Pantasote Products become a logical choice. The fact that they almost invariably last for the life of the car, through storm and shine, heat and cold, compensates many times for their slight extra cost. More than a quarter century of practical proof stands back of the facts that Pantasote curtains and seats will not crack, harden or flake and that Agasote headlinings, roofs, wainscotings, etc. are virtually indestructible.

Specify Pantasote and Agasote. Insist upon getting them for new cars, for rehabilitation. In the end it always pays!

Next week we will take you to the Middle West where Pantasote and Agasote have grown up with the electric railway industry and are now almost exclusively specified.

Pantasote Products would not be so universally used *unless Economy prevailed after all!*

Specify them for your buses also!

Warning!

There is no substitute for Pantasote

BATES

POLES

Every practical consideration suggests Bates Poles

Bates Steel Poles embody every practical advantage that can be looked for in a supporting structure. They are obtainable on short notice, and easily transported and erected. They are easily protected by painting against the attack of rust, as all surfaces are exterior. Strength and freedom from deterioration give them long life, and even their first cost is surprisingly low. The illustration above is part of the electrified division of the Erie R.R. along the State Barge Canal at Rochester, N. Y. Mr. R. C. Thurston, Supervisor of electrical service at Avon, N. Y. states his preference for Bates Poles, "because they are strong, convenient, and economical." On every type of supporting structure for electrical service, a Bates estimate will be interesting and valuable to you. Let Bates engineers figure on your requirements.

Expanded Poles, Fabricated Towers or Substations—Painted or Galvanized

Bates Expanded Steel Truss Co.

231 SOUTH LA SALLE ST., CHICAGO, ILL.

Behind the Bus—Efficient Terminal Buildings

TEN vital questions must be answered before you start your new bus terminal.

The Austin Company has prepared a special folder on motor bus terminals, from its large fund of experience already gathered in this comparatively new field. It is designed to help the executive who is approaching the subject of building better terminal facilities to back up the buses.

Austin's experience in the design and construction of bus terminals is backed by many years' experience in the economical design and efficient layout of railroad and industrial buildings.

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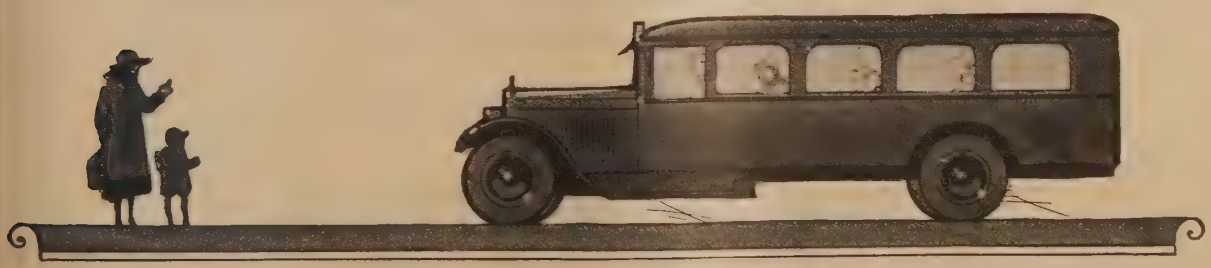

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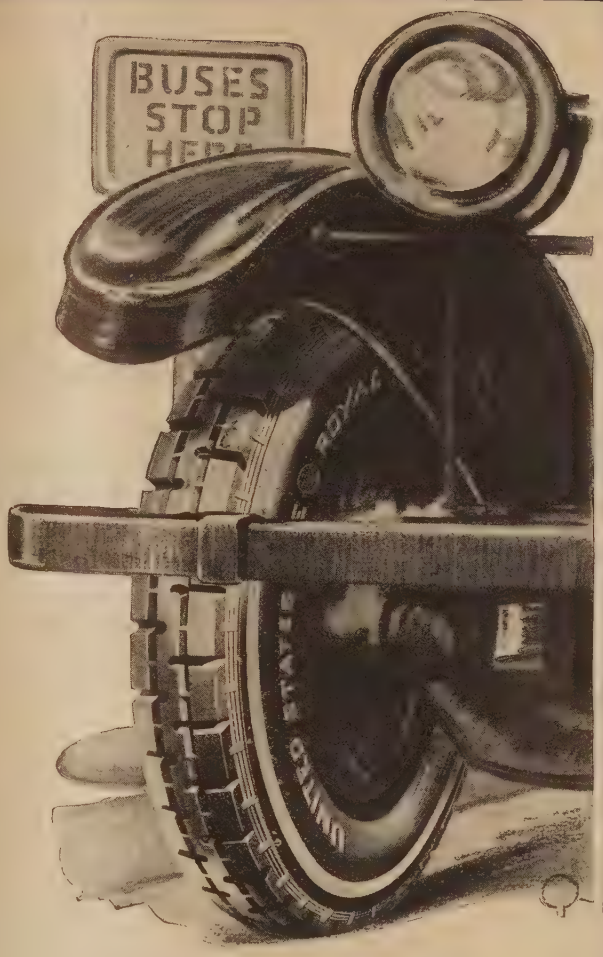

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In order to have a complete understanding of all the facts concerning bus operation, the United States Rubber Company maintains groups of tire experts in every part of the country. They are making a day-to-day study of bus operation in their respective localities. Their reports are the basis on which information is made available to bus operators to help them get the best service from their tire equipment.

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Uniform torque of electric drive means less tire wear.

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Greater riding comfort—no vibration or jerks during starting, and smooth acceleration.

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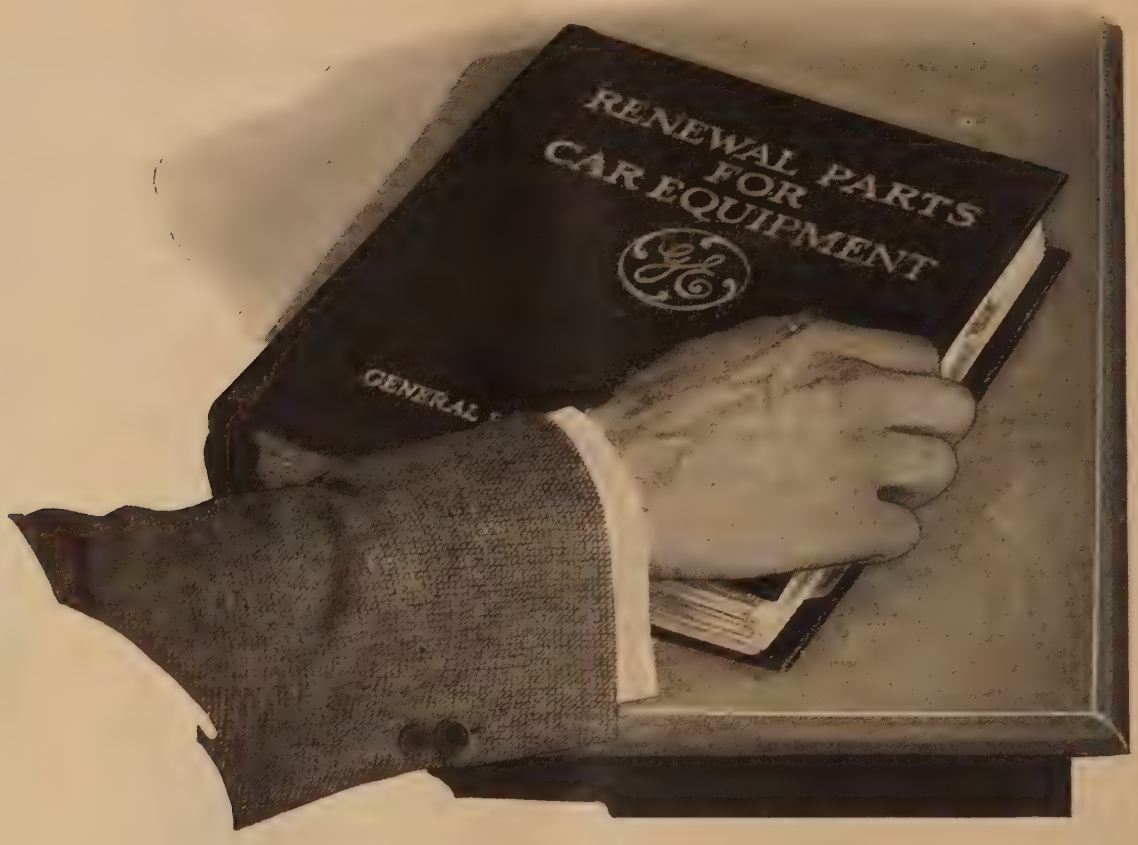

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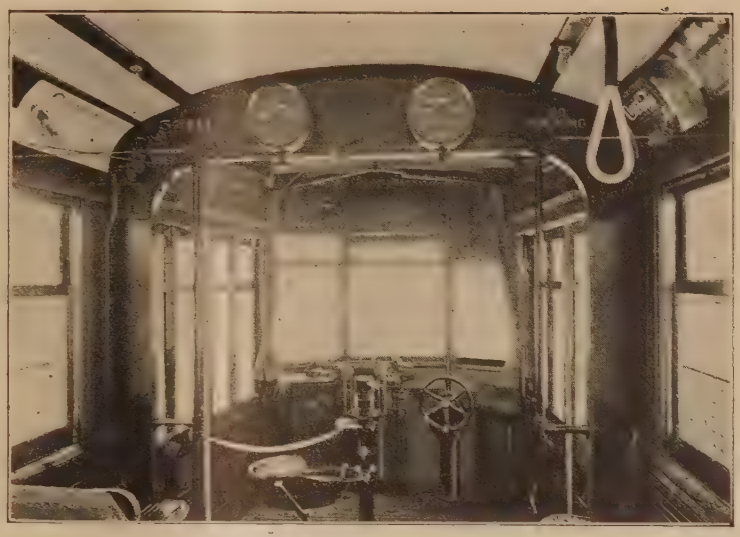

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What a European Manager Thinks of a New American Book

If this book is so valuable to a leading foreign manager whose practice is so different, it should be even more valuable to the American electric railway operator.

The following excerpts are from a signed review of the new edition of Blake and Jackson's "Electric Railway Transportation". It was contributed by Mr. William Stein, Regierungsbaumeister a. D., and managing director of the Hamburg Elevated Railway. It was published in the issue of "Verkehrstechnik" for May 22, 1925.

"The first edition of this book appeared in 1917 but hardly became known in Europe because of the war. The new edition deserves special attention because it offers a book which is unique of its kind. There are many books in which the technical features of the operation of electric railways are considered. Here is one which is concerned directly with the business of transportation itself—namely the experience and science of the operating manager. The material is treated from many sides but so thoroughly and skillfully that the book may well be called a model in the combination of useful facts.

"Naturally, the discussions of electric railway operation are treated primarily from the American standpoint. Nevertheless, there are references to European experience, though not in extenso. Whoever wants to learn about American railway practice and whoever realizes that the conditions as they exist over there, prevail to a greater or less extent also on this side of the ocean, ought to study this book thoroughly.

"The first subject considered is the organization of the transportation department or the relations between the various transportation officers and their functions, as developed on small and large systems. The authors especially emphasize the need for close relations between the transportation department and those connected with the technical side of the service. In this connection, the reader will learn that the American Electric Railway Association has compiled an extensive list of technical terms connected with electric railway operation and has carefully defined them, so that throughout the country the same terms have the same meanings in all circumstances. For example, zone systems are classified in four divisions, while here we recognize only one, although we have like varieties.

"Further on, there is a discussion of the methods of checking and tabulating traffic statistics, this section being aided by many significant data, diagrams and illustrations which are explanatory of the noteworthy methods employed. Since the traffic in American cities has greater hourly fluctuations than are customary in Europe and since there is need of providing skilfully for this traffic, such as from great plants like the Ford Motor Works, especial attention has to be paid to any means that will modify the peaks. Further on, in the discussion on fares, the matter of flat fares and various forms commutation tickets and passes is considered. An American Zone fare practice worth attention is that of issuing zone checks on pay-leave operation.

"The most valuable part of the book, however, is that in which new types of cars and the methods of collecting fares are discussed. While these are entirely different from those in Europe, they have been developed to great efficiency. These two matters—the collection of fares and the design of cars—are closely related, because the conductor remains in a definite place where he can undertake any duties that are likely to arise in operation. These different conditions including one-man operation, have never been set forth so comprehensively and so clearly as in the book mentioned. A study of this chapter is, therefore, very much worth while.

"The courteous handling of the passengers on the car, destination signs, publicity and schedules are also well treated as is also the question of the relation between the street railway and the bus. The field of the bus is seen to be much the same as with us. One peculiarity of the American car-bus problem, however, is the large number and extent of low traffic density interurbans. Some of these lines have actually been taken up and their services replaced by the motor-bus.

"The reader can also learn much about the handling of the personnel, which differs widely from our practices. For example, rotation of runs among the men operating from a depot is rare, the usual practice being to assign the runs to the same men regularly on a seniority basis. Much information is also given in this connection on methods of discipline, mutual benefit associations and employee welfare work—in all of which the practice differs notably from that in Europe.

"All in all, the book contains so much that is very worth while that there should be a copy in the library of every street railway system."

This book was written by Henry W. Blake, senior editor *Electric Railway Journal*, and Walter Jackson, fare and bus consultant. It is a complete guide to the best modern electric railway transportation practice. It contains 437 pages and 121 illustrations. The price of the book alone is $5.00.

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These cars are now being received and placed in service. Together with the two hundred of the same type which began operation during the Fall of 1923 they enable this company to render better service to its car riders, and secure reductions in maintenance and operating costs.

Designed for rapid acceleration and retardation and shorter duration of stops, these cars afford increased scheduled speed, producing more car miles per car hour and permitting a better "merchandising of transportation."

E. E. Morgan

Vice-President and General Manager
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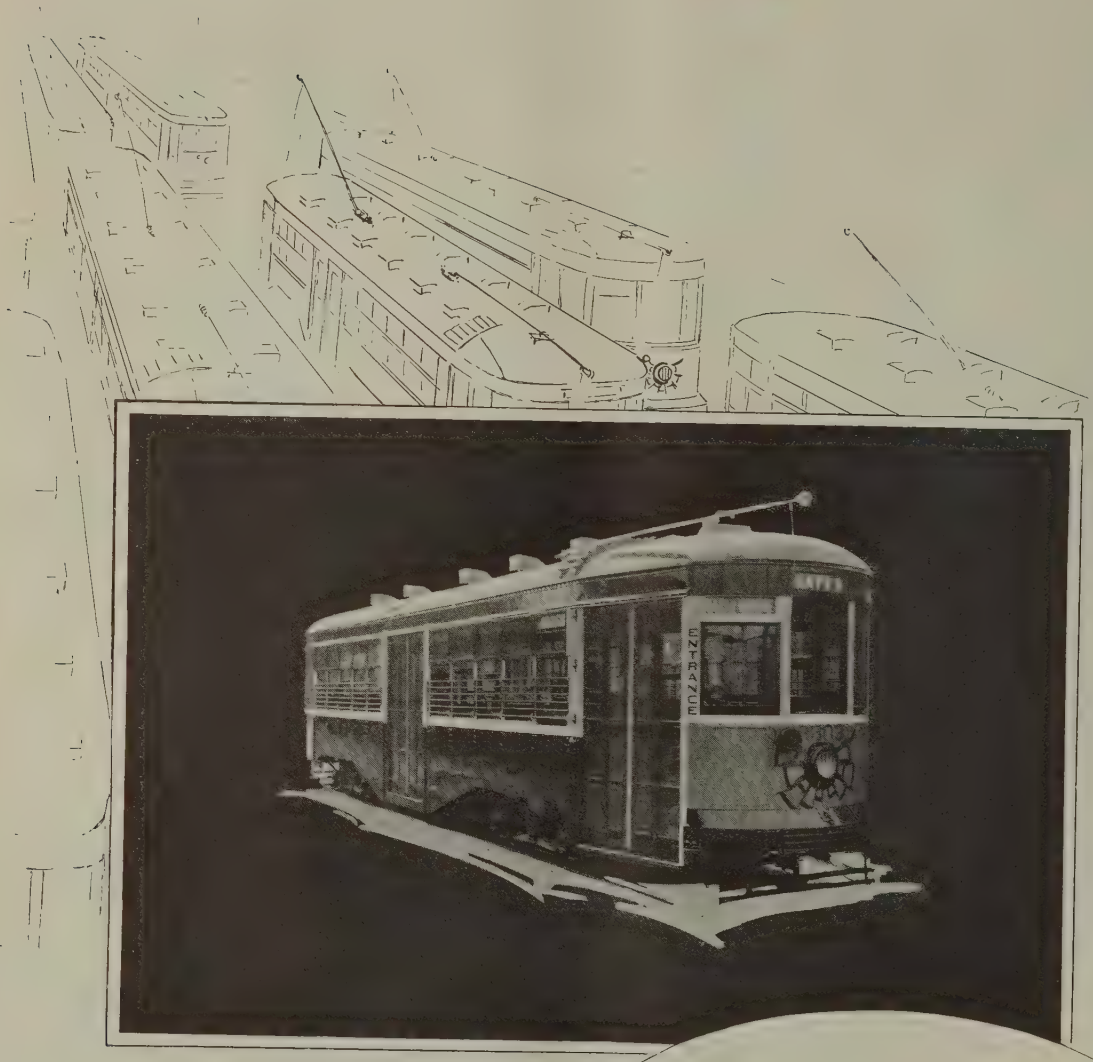

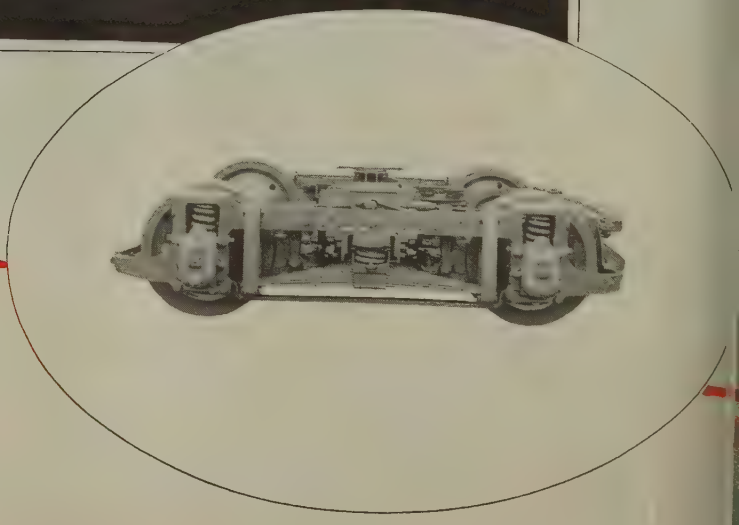

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Attractiveness, Speed and Economy

Sure-fire Safety—at least upkeep cost

On all of Brooklyn City's new cars, Root Steel Spring Life Guards are a standard specification.

FOUR sound reasons stand back of Brooklyn's choice. They are well worth your careful consideration.

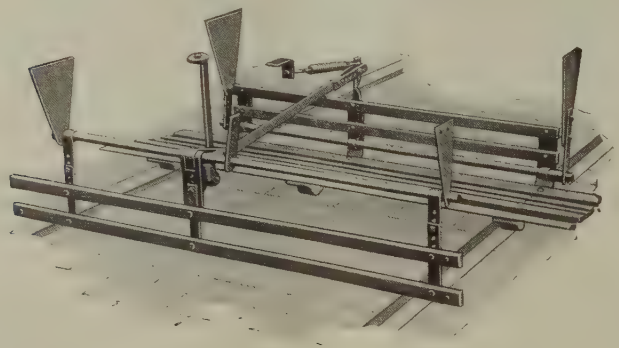
(1) The Root Spring Life Guard is essentially simple and easy of installation.

(2) Having no intricate mechanisms, and being made of the highest grade materials, in weights and sections amply large for the service, upkeep is practically negligible.

(3) It cannot possibly slip down accidentally, and when down can be reset by the motorman from his platform.

(4) It is all that the name signifies—A LIFE GUARD. No object can get through or under the guard when down.

Write us for further details of this and other Root Spring Specialties.



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100 more "Quality" Cars for Brooklyn

A repeat order for the cars
And a repeat for St. Louis seats

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Ordered For Twenty Five Of These Cars

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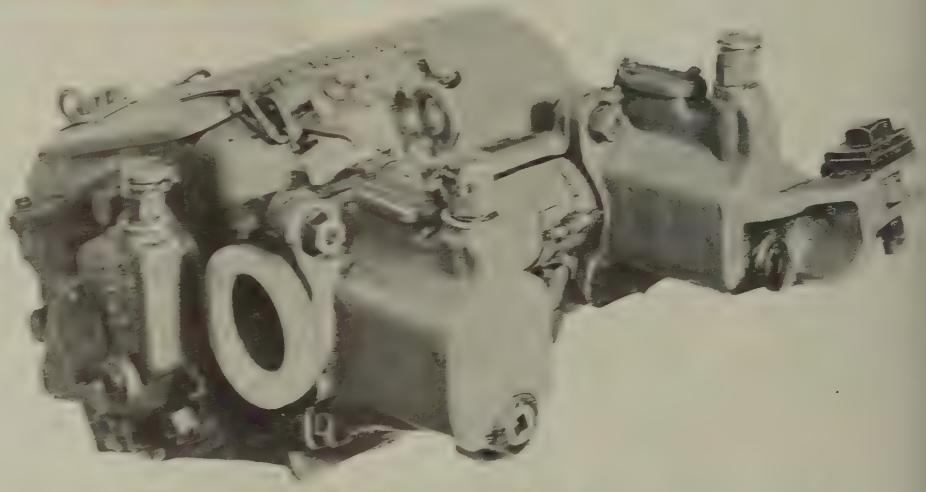

For *all* these latest cars!

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Westinghouse No. 510 A motors, being especially adapted for modern city service, where high acceleration plus fast free-running speed is essential, have been selected for all the 335 additional new cars.

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Ahead of all the other traffic !

The street car leads in Brooklyn by superior speed and acceleration

Automobiles, taxis, trucks — they all *trail* these whizzing cars that the Brooklyn City Railroad uses. They simply can't get by 'em on the runs from corner to corner. Faster in accelerating, these cars also reach and maintain a speed between stops that frustrates even the wildest of taxi-men.

Running times have been reduced by several minutes and the leadership of the street car as the basic means of urban transportation has been re-established.

More and better-satisfied patrons, increased revenue and decreased expenses — these have been the fruits of the first 200 cars, fruits which have led the management to order 335 more,— all Westinghouse-equipped.

Are there similar possibilities on your road? Let our engineers assist you in the investigation.

Westinghouse Electric & Manufacturing Company
East Pittsburgh Pennsylvania
Sales Offices in All Principal Cities of
the United States and Foreign Countries

Quick Getaway and Effective Brakin

BRAKES! Variable Load

Speeding Up City Traffic

EVEN fractions of a second count in shortening runs like those in Brooklyn where stops are frequent. The Variable Load Brake provides a retarding force which automatically adjusts itself to the car loading so that stopping distances are uniform. This reduces the average time consumed in stopping and cuts down the running time between stops, by permitting longer peak-speed operation. A general speeding up of service is the result.

Westinghouse Variable Load Brakes "made good" on the first 200 Brooklyn cars, and they are being used on the new cars, making a total of 535 equipments. All of these cars have DH-16 Compressors—the well-known Bungalow type.

Westinghouse Traction Brake Co.
General Office and Works, Wilmerding, Pa.

Control! Safety Car Devices

Safeguarding City Traffic

INTERLOCKING of car control, brakes, doors and steps, by means of the Safety Car Control Equipment, prevents door opening before the stop is completed, and likewise prevents a start before the doors are closed. This feature also causes automatic cutting off of current and emergency brake application if the operator releases the controller handle through carelessness or disability.

Brooklyn tried out the Safety Car Devices on the first 200 cars with entire satisfaction, and they are being used on the 335 new cars. Over 400 other traction properties are realizing the benefits derived from using Safety Car Control Equipments.

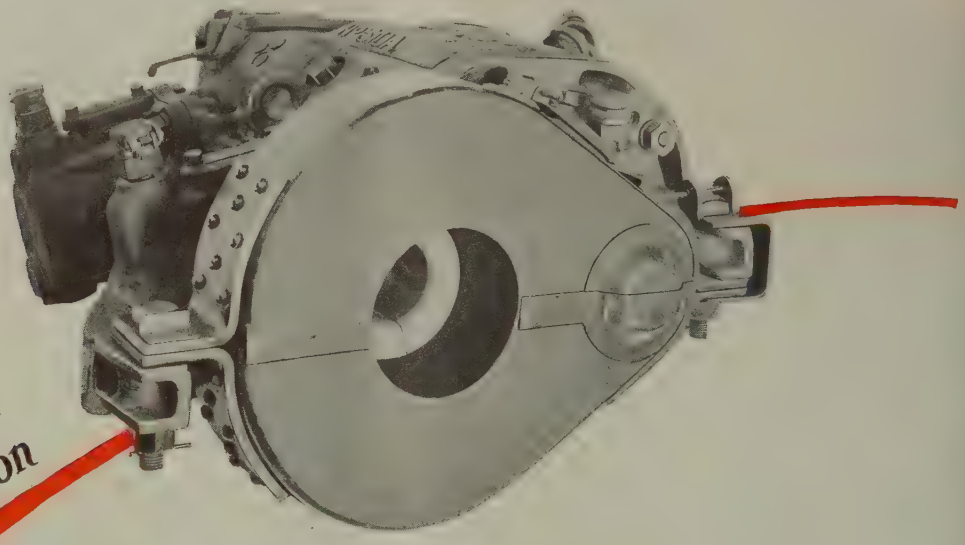
SAFETY CAR DEVICES CO.
OF ST. LOUIS, MO.

Postal and Telegraphic Address:
WILMERDING, PA.

CHICAGO SAN FRANCISCO NEW YORK WASHINGTON PITTSBURGH

Modern Cars Scientifically Designe

For lightness—strength—low maintenance



Brooklyn's Specification

1340

Chillingworth

Drawn Steel Seamless

Gear Cases

Applied to W. H. 510 A Motors

To start with—The price and weight of this Gear Case are less than Malleable Iron, and stronger than built-up steel cases.

Then again—Tough, flexible drawn steel is not so liable to serious breakage,—gives your gears utmost protection.

Repairs are less expensive because seamless steel is more easily welded and riveted than iron.

The one-piece construction of Chillingworth Gear Cases with *overlapping* joint between the two halves absolutely prevents the entry of dust or the escape of grease. There are no seams to open up.

Expensive gears are entitled to this 100% protection for utmost economy in operation.

Chillingworth Manufacturing Co.

JERSEY CITY, N. J.

Sold in Canada by
RAILWAY & POWER ENG. CORP.
Toronto Montreal Winnipeg

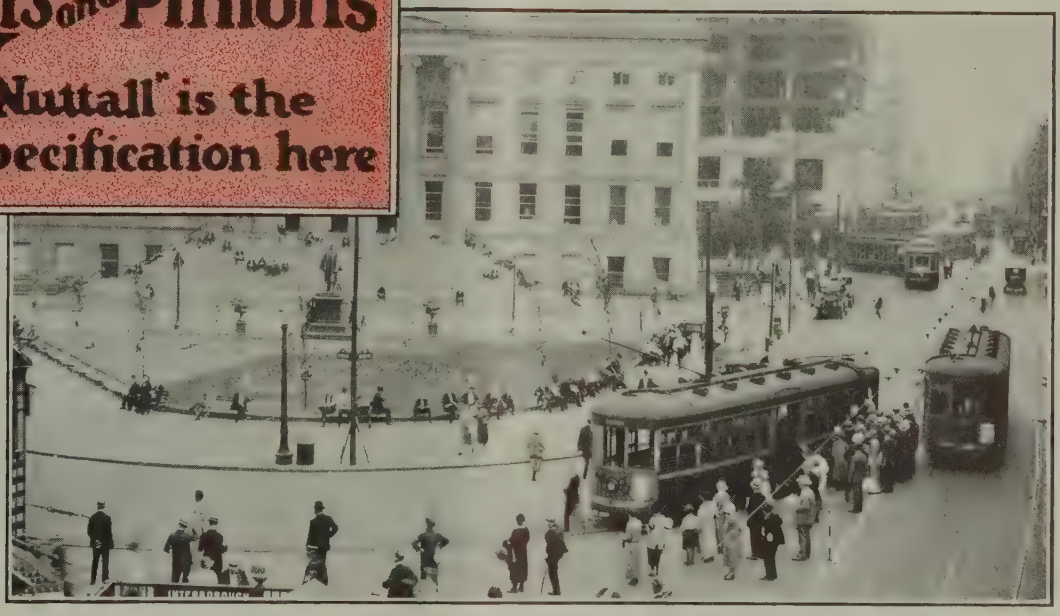
Representatives:
H. F. KEEGAN & Co., Chicago
J. W. GERKE, New York

Sold in England by
CROYDEN ENG. CORP.
Croyden

ave Energy in Brooklyn

Gears and Pinions

✓ "Nuttall" is the specification here



Drive 'em!

Off with a flying start — whizzing to the next corner — stop 'em, start 'em, drive 'em — that's the way they beat the autos!

Underneath the car, where the driving is done — what's there, to stand this gaff?

"Nuttall" BP gears and pinions! Naturally they're "Nuttall", because that's where railway men turn for "tough-hard", quiet-running gears.

R.D. NUTTALL COMPANY
PITTSBURGH PENNSYLVANIA

All Westinghouse Electric & Mfg. Co. District Offices are Sales Representatives in the United States for the Nuttall Electric Railway and Mine Haulage Products. In Canada: Lyman Tube & Supply Co., Ltd., Montreal and Toronto.

MEMBER ELECTRIC RAILWAY MFRS. ASSOCIATION

Nuttall

Modern Cars Build Busines

150 of these new cars are equipped with National Pneumatic door control

Go through the specifications of practically any new car order and you'll find that they call for National Pneumatic Door and Step Operating equipment.

NATIONAL

r Brooklyn City Railway

Handling Brooklyn crowds with speed

No other method for the operation of doors and steps can compare with the pneumatic engine on the score of speed with simplicity and absolute safety. Opening and closing is *cushioned;* there is no danger even to a small child; there is no slamming and banging to cause rapid deterioration of door frames and parts.

NATIONAL PNEUMATIC COMPANY

***Executive Office,* 50 Church Street, New York**
***General Works,* Rahway, New Jersey**

CHICAGO McCormick Building — MANUFACTURER IN TORONTO, CANADA Dominion Wheel & Foundries, Ltd. — PHILADELPHIA Colonial Trust Building

NP

PNEUMATIC

Quick Getaway and Effective Brakin

PEACOCK STAFFLESS BRAKES

Installed and Used on Brooklyn's Cars

NOT merely "installed", as emergency equipment, but used every day, every trip by every operator. It's part of the rigid safety policy on The Brooklyn City Railroad, to insure that hand brakes are always in working order, and that men know how to use them effectively.

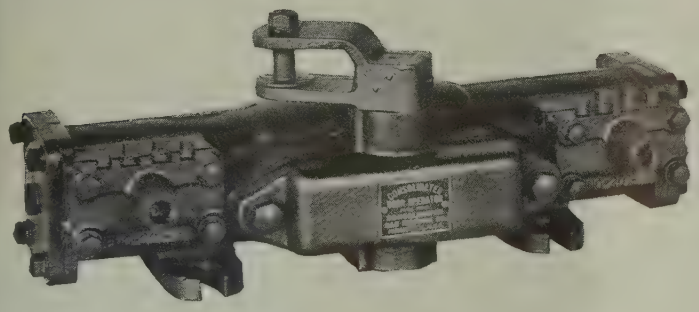
And just as Peacock Staffless Brakes have been the choice in the past, they are included on these latest cars as a matter of course. Emphatically—they've made good!

National Brake Co., Inc.
890 Ellicott Sq., Buffalo, N. Y.

Canadian Representative
Lyman Tube & Supply Company, Limited, Montreal, Canada

Here it is!

eat Automotive Traffic in Brooklyn



CONSOLIDATED DOOR ENGINES

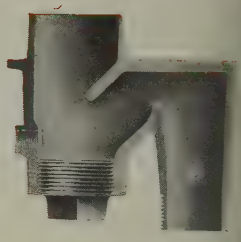
For 200 new cars in 1923
For 185 new cars in 1925

Consolidated Door Engines have firmly established their place as a factor in the electric railway field. They give such satisfactory service and need such slight maintenance that repeat orders come naturally.

CONSOLIDATED CAR-HEATING COMPANY
Albany
New York Chicago

O-B Product

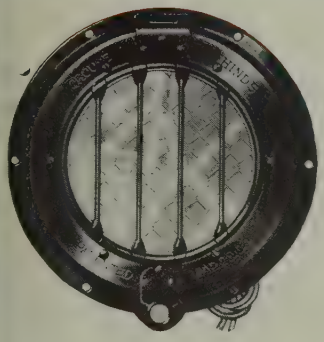
O-B
Trolley Bases



O-B
Sand Traps

ovides Passenger Comfort and Safety

The high spots of operating efficiency on Brooklyn's new cars



Imperial Headlights

Improved O-B Self Oiling Trolley Catchers

In the execution of Brooklyn City Railroad's order each manufacturer has given of his best in the effort to produce street railway cars worthy of modern standards.

We are proud to have contributed the above mentioned standard O-B Specialties, as we believe, the best and most efficient that present day practice can afford.

The Ohio Brass Co.

Mansfield, Ohio, U.S.A.

TROLLEY MATERIAL — ELECTRIC RAILWAY CAR EQUIPMENT — RAIL BONDS — HIGH TENSION PORCELAIN INSULATORS — THIRD RAIL INSULATORS

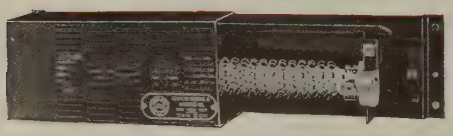
NEW YORK — PHILADELPHIA — PITTSBURGH CHICAGO — CHARLESTON, W. VA. LOS ANGELES — SAN FRANCISCO — PARIS, FRANCE

Dominion Insulator & Mfg. Co., Limited Niagara Falls, Ontario, Canada

More Gold Car Heaters for Brooklyn

8040 more to be exact!

6030 Truss Plank
1340 Panel
670 Vestibule



No. 478E Truss Plank

No. 414E Panel

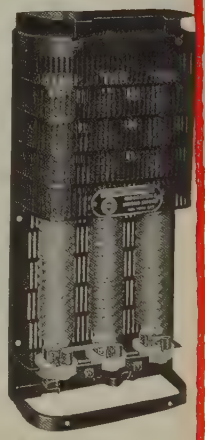
About eighteen months ago, when the first 300 of The Brooklyn City R.R.'s new cars were placed on the tracks, 4800 Gold Car Heaters went into service to keep Brooklyn car riders comfortable.

Now comes Brooklyn's second big order, with Gold Car Heaters again on the specification sheets.

And when such an experienced and successful operating company as The Brooklyn City Railroad "comes back for more" it is mighty strong evidence of proved successful operation of Gold's Electric Heaters with their Low Cost of Installation, Ease of Inspection, Ease of Repairs, if necessary, which spells ECONOMY and the Proper Material for Coils, which is the heart of an Electric Heater, spells EFFICIENCY.

Nor is Brooklyn City alone in the choice. Gold's Electric Heaters have been consistently specified by many other famous electric railway systems and steam railroads using electric heating.

We manufacture all types of heaters and thermostatic control adapted for every class of railway service, from trackless trolley to railroad car; also for waiting rooms, etc. Write us.



No. 470E Vestibule

GOLD CAR HEATING & LIGHTING CO.
Bush Terminal
220-36th St., Brooklyn, N. Y.

All Coil Supports Interchangeable

ave Energy in Brooklyn

Keystone

written on the record
of Brooklyn's revenue-
building trolley cars

Get more patrons—
and keep 'em satisfied

That's the principle on which the Brooklyn City Railroad is being made a public utility in the truest sense—and incidentally a financially successful traction system.

Plenty of conspicuous route and destination signs, and also a practical, always-on-the-job passenger signal system are two of the outstanding equipment details which materially aid in attracting traffic patronage, and holding it.

- *FARADAY SIGNAL SYSTEMS*
- *INTERNATIONAL FARE REGISTERS*
- *HUNTER DESTINATION SIGNS*

ELECTRIC SERVICE SUPPLIES CO.

PHILADELPHIA
17th and Cambria Sts.

NEW YORK
50 Church St.

CHICAGO
Monadnock Bldg.

PITTSBURGH
839 Oliver Building

BOSTON
88 Broad St.

SCRANTON
316 N. Washington Ave.

DETROIT
General Motors Building

Lyman Tube & Supply Co., Ltd., Montreal, Toronto, Vancouver

Attractiveness, Speed and Econom

Fine new cars~and sur

TEX

LUBRICATION

TEXACO

THE TEXAS COMPANY, U. S. A

Texaco Petroleum Products

arn Greater Net Revenue in Brooklyn

f a good start with

ACO

SERVICE

FOR years the Brooklyn City Railroad and all of the B.M.T. lines have been TEXACO Serviced.

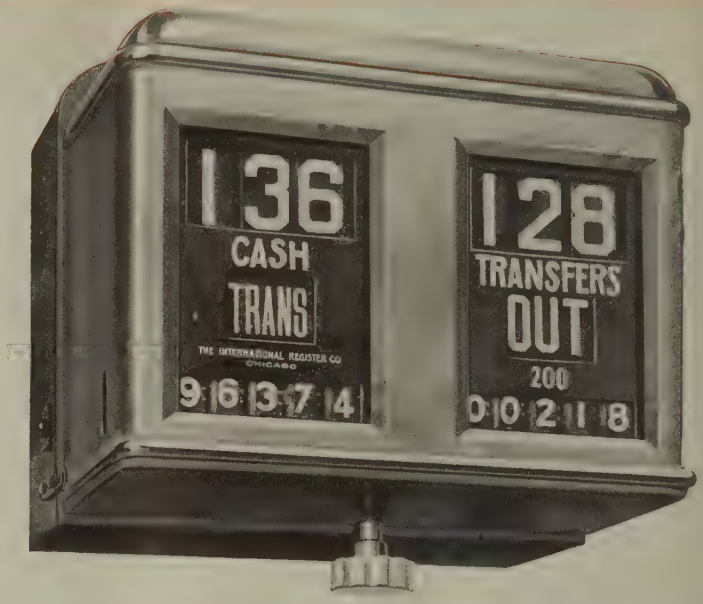
TEXACO Engineers have constantly worked right in with the roads' own operating engineers, and have placed the lubrication of every moving part in these vast transportation systems on a uniformly efficient and economical basis.

Certainly the new equipment, now being delivered to the Brooklyn City Railroad, is assured of a fine start and a long life of profitable operation with TEXACO products supplying the lubrication.

Battery Place, New York, N. Y.

Offices in principal cities

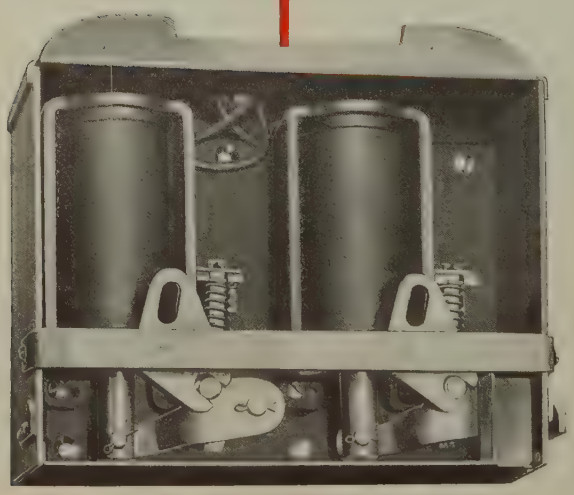
International Registers *in* Brooklyn



R12 electrically operated double register

Electrically operated from fare boxes!

B12 Electric Back for double register



International registers have been used on the Brooklyn system for thirty years, their purchases having exceeded 2500.

The new type Internationals, the R12 double register, electrically operated, were installed on the first 200 of this new type of car, and have given such efficient service that the remaining 335 cars are being similarly equipped. The cash side is operated by the dropping of a nickel or dime; the ticket side by a push button.

The various types of International registers today are the logical development of over thirty years of register design and construction by this company. They are practically the standard of the electric railway industry.

The International Register Co.
15 South Throop Street, Chicago, Illinois

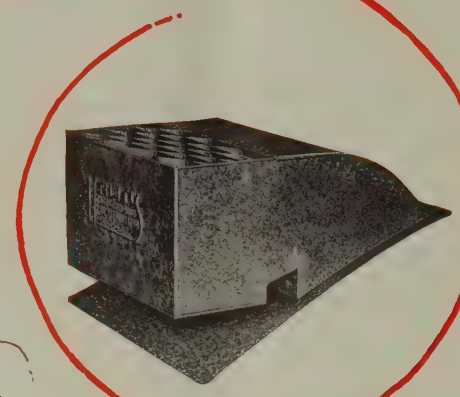
rings New Riders in Brooklyn

Visible, Audible, Instantaneous, Automatic Registration

THE experience in one year with the new electrical Johnson Fare Box in operation on the 200 Brooklyn cars, and the 335 now being installed on the new Brooklyn cars, proves:

1. The type "J" Electric Fare Box will reduce your present maintenance fare collection cost fifty per cent (50%).
2. It relieves the Conductor of at least 75% of the present duties he has to perform as to fare collection.
3. The "J" Box will save at least 10% of your present loading time.
4. It makes inspection for your Secret Service and Inspectors at least 25% easier and far more accurate.
5. It is impossible to estimate how many accidents this new equipment will prevent on one-man cars and buses, but it stands to reason that if an operator has no fare collection duties to perform, other than making change, he can give considerably more attention to the driving of the car and looking out for the passengers.
6. It will increase the receipts at least 4%.

Johnson Fare Box Co.
Ravenswood, Chicago, Ill.



No complaints on the score of fresh air!

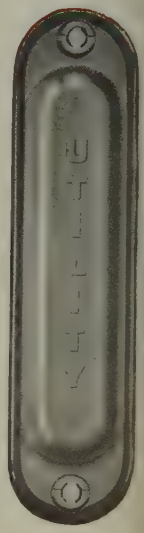
They all want fresh air!

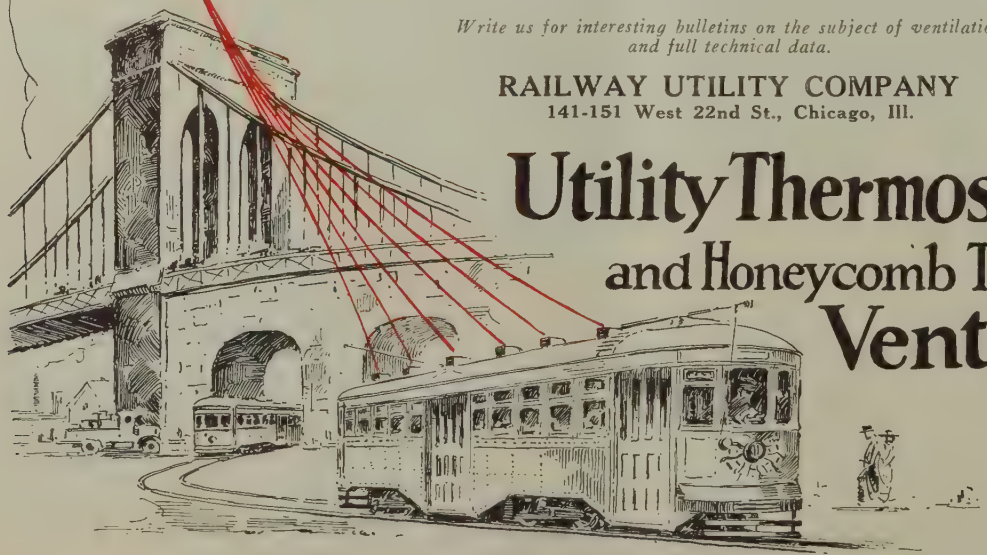
But some like it hot and some like it cold; some don't mind if it whistles 'round their ears, others can cause the conductor no end of worry, and create no little ill-will, if they're forced to sit in a draught.

So Brooklyn's new cars together with the cars of the Chicago Surface Lines and many other progressive roads, are fitted with Utility Honeycomb Roof Ventilators and Utility Thermostats scientifically constructed to maintain a uniform temperature and give an ample flow of clean fresh air, without draft, without noise, and with absolute protection against weather.

Write us for interesting bulletins on the subject of ventilation and full technical data.

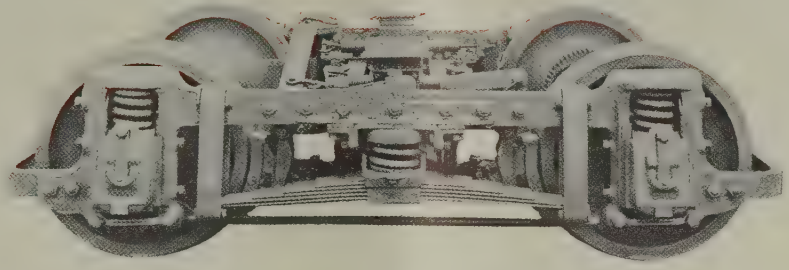
RAILWAY UTILITY COMPANY
141-151 West 22nd St., Chicago, Ill.





Utility Thermostats and Honeycomb Type Ventilators

Provides Passenger Comfort and Safety



"For the business end" of the new car

ROLLED WHEELS

STANDARD STEEL WORKS COMPANY

Philadelphia, Pa.

BRANCH OFFICES:

CHICAGO	PORTLAND, ORE.	ST. PAUL, MINN.
ST. LOUIS	RICHMOND, VA.	PITTSBURGH, PA.
NEW YORK	SAN FRANCISCO	LOS ANGELES, CAL.
HOUSTON, TEXAS	BOSTON	MEXICO CITY, MEX.

WORKS: BURNHAM, PA.

Attractiveness, Speed and Econom

Brooklyn comes to

For Trolley Poles and Wheels

Only the best of service-proved equipment would do for Brooklyn City's new car order. Columbia Trolley Poles and Wheels were specified because for years past they've been piling up unusually good service records all over the country—a natural result of sound practical design backed by 35 years' experience in the building of such equipment.

Columbia Trolley Poles are made in butt weld and seamless types, reinforced at the lower end to take up bending strains. Standard lengths 11 to 16 ft.

Columbia Trolley Wheels are made exclusively of virgin metal alloys developed through years of experimenting for just-right hardness for least wire wear and greatest wheel mileage.

COLUMBIA

Air Brake Handles
Armature Bearings
Armature Coils
Brake Parts
Controller Handles
Controller Parts
Commutators
Door Mechanisms
Gear Cases
Resistance Grids
Motor Parts
Trolley Harps, Poles, Wheels, etc.
Also Iron, Steel, Brass, Bronze and White Metal Castings; Drop Forgings

Columbia Machine Works
3313 Atlantic Avenu

arn Greater Net Revenue in Brooklyn

Columbia, Brooklyn—

For Nevasplit Headlinings

Notice the headlinings of these new Brooklyn cars—smooth, perfectly formed and flawlessly painted. Nevasplit gives this fine finish *always*, with least installation trouble and expense. What is more, Nevasplit headlinings keep their appearance year in and year out.

And there are sound reasons why! Nevasplit is wood in its highest form of refinement—a wood fiber board without knots, grain, sap or artificial stiffening. It has tremendous tensile strength, is non-inflammable, water-proof and a splendid heat and cold insulation. Its efficiency and economy has been consistently demonstrated in years of service on every type of electric railway passenger car.

COLUMBIA

- Armature Bearing Babbitting and Broaching Machines
- Armature Buggies
- Armature Lead Flattening Rolls
- Shaft and Axle Straighteners
- Babbitting Molds
- Banding and Heading Machines
- Car Hoists
- Coil Winding and Taping Machines
- Pinion Pullers
- Pit Jacks, etc., etc.

Malleable Iron Company
Brooklyn, N.Y.

COLUMBIA MACHINE WORKS 1862

Modern Cars Build Business

The trolley cord Samson Spot

The consistently long life and uniform high quality of Samson Spot Trolley Cord have long been demonstrated in everyday service on Brooklyn's street cars. So it was but natural that this tough, flexible, smoothly-braided and waterproof cord should be specified for the 335 new cars on the Brooklyn City R.R.'s orders.

Write for Samples.

The Samson Cordage Works, 88 Broad St., Boston, Mass.

Prime Essentials of the Modern Track

Concrete for permanence . . . steel for strength . . . Wood blocks cushioned in asphalt for shock absorption.

Permanence, strength, resiliency—these are the **undisputed**, prime essentials of the modern track.

Judged on that basis Dayton Resilient Track scores 100!

The Dayton Mechanical Tie Co.
707 Commercial Building
DAYTON, OHIO

DAYTON Resilient TIE

Arc Weld Rail Bonds

AND ALL OTHER TYPES
Descriptive Catalogue Furnished

American Steel & Wire Company

Chicago
New York
Boston
Cleveland
Pittsburgh
Denver
U. S. Steel Products Co.
San Francisco Los Angeles Portland Seattle

BRAKE SHOES
AERA Standards
Brake Heads

Diamond "S" Steel Back and Lug Shoes best for all equipment.

Manufactured and sold under U. S. Patent and Registered Trade Mark.

American Brake Shoe and Foundry Co.
30 Church Street, New York
332 So. Michigan Ave., Chicago

ACME WIRE

PRODUCTS

Acme engineers have studied electrical insulating materials for years. Perhaps they can solve your problem.

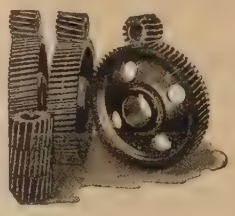
ACME MAGNET WIRE
"Enamelite"—Plain enameled copper wire
"Cottonite"—Cotton-covered "Enamelite"
"Silkenite"—Silk-covered "Enamelite"
Magnet Wire—Cotton or silk, single or double

ACME COIL WINDINGS
Field Coils, Meter Coils, Ignition Coils, Windings for Audio and Radio Frequency Transformers.

ACME VARNISHED INSULATIONS
Varnished Cambrics—
Black and yellow
Varnished Silks and Tapes—
For every requirement
Varnished Papers—
Black and yellow
Varnished Tubing—
"Spaghetti," all sizes, 5 colors
"Celatsite" Wire—
Tinned, spaghetti-covered wire for radio sets; 5 colors
Insulating Varnishes

Catalog sent Engineers and Executives

THE ACME WIRE COMPANY
Main Office and Plant, New Haven, Conn.
New York, 52 Vanderbilt Ave.; Chicago, 427 West Erie Street; Boston, 80 Federal Street; Cleveland, Guardian Bldg.;



"Tool Steel" helical gears are Quiet on the start and Continue Quiet because They don't wear.

BUY THE BEST

The Tool Steel Gear and Pinion Co.
CINCINNATI, OHIO

You're having brush trouble

CORRECT IT

USE LE CARBONE CARBON BRUSHES

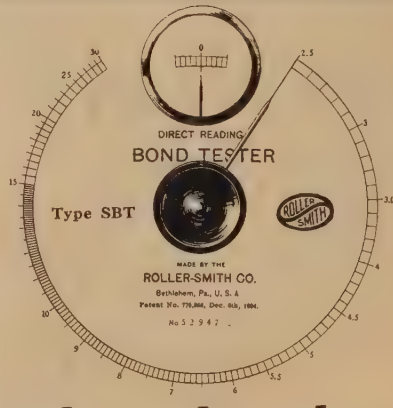
They talk for themselves

COST MORE PER BRUSH
COST LESS PER CAR MILE

W. J. Jeandron
345 Madison Avenue, New York

Pittsburgh Office: 634 Wabash Bldg.
Chicago Office: 1657 Monadnock Block
San Francisco Office: 525 Market Street

Canadian Distributors: Lyman Tube & Supply Co., Ltd., Montreal and Toronto



Check up these losses!

Assuming 30 ft., 70 lb. A.S.C.E. rails and a well-known make and type of bond, the cost of bonding five miles of track is about $1,318.50.
The resistance of each bond under perfect conditions is equal to 2.51 ft. of unbroken rail.
Increase of resistance to average of 10ft, means losses in bonds equal to about $1,698.58 *over normal loss* (assuming current at two cents per kw.h.).
The "One-Man" ROLLER-SMITH Bond Tester locates these leaks and warns you of your losses.

Send for Bulletin No. G-200 and G-201.

"An Experience of over thirty years is behind every ROLLER-SMITH product."

ROLLER-SMITH COMPANY
Electrical Measuring and Protective Apparatus

Main Office:
2128 Woolworth Bldg.,
NEW YORK

WORKS:
Bethlehem, Penna.

Offices in principal cities in U. S. A. and Canada, also in Havana, Cuba.

AMERICAN BRIDGE COMPANY

EMPIRE BUILDING—71 BROADWAY NEW YORK

Manufacturers of Steel Structures of all classes particularly BRIDGES AND BUILDINGS

SALES OFFICES:

NEW YORK, N. Y.....Empire Bldg.
Philadelphia, Pa.....Widener Bldg.
Boston, Mass.....120 Franklin St.
Baltimore, Md.....Continental Bldg.
PITTSBURGH, PA.....Frick Bldg.
Cincinnati, Ohio.....Union Trust Bldg.
Cleveland, Ohio.....Rockefeller Bldg.
Detroit, Mich. . . Buhl Building
CHICAGO, ILL.....208 So. La Salle St.
St. Louis, Mo..Liberty Central Trust Bldg.
Denver, Colo....First National Bank Bldg.
Salt Lake City, Utah..Walker Bank Bldg.
Duluth, Minn.....Wolvin Bldg.
Minneapolis, Minn.....629 2nd St., S. E.
Pacific Coast Representative:
U. S. Steel Products Co., Pacific Coast Dept.
San Francisco, Cal.....Rialto Bldg.
Portland, Ore.....Selling Bldg.
Seattle, Wash..4th Ave. So., cor Conn. St.

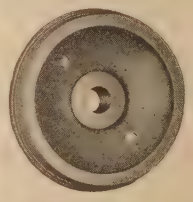
Export Representative: United States Steel Products Co., 30 Church Street, New York

Lorain Special Trackwork Girder Rails

Electrically Welded Joints

THE LORAIN STEEL COMPANY
Johnstown, Pa.

Sales Offices:
Atlanta Chicago Cleveland New York
Philadelphia Pittsburgh
Pacific Coast Representative:
United States Steel Products Company
Los Angeles Portland San Francisco Seattle
Export Representative:
United States Steel Products Company, New York, N. Y.



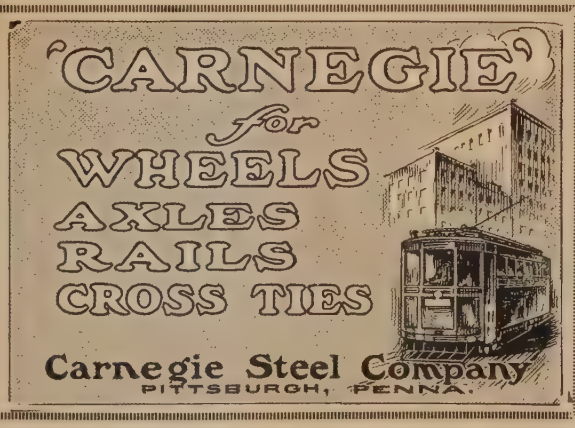
Cambria Rolled Steel Electric Car Wheels

Best for Longer Service

Other products for the electrical field includes axles, armature shafts, rails, spikes, track work, splice bars, bolts, tie plates, tie rods, pole line material, sheets, magnet steel and gear blanks.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

BETHLEHEM



BARBOUR-STOCKWELL CO.

205 Broadway Cambridgeport, Mass.
Established 1858

Manufacturers of

Special Work for Street Railways

Frogs, Crossings, Switches and Mates
Turnouts and Cross Connections
Kerwin Portable Crossovers
Balkwill Articulated Cast Manganese Crossings

ESTIMATES PROMPTLY FURNISHED

E. G. Long Company

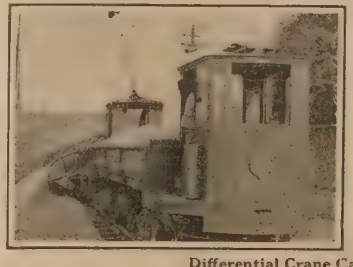
50 Church St., New York

Electric Railway Materials
Peckham Truck Parts

New York Representatives:

American High Speed Chain Co.—Silent Chain Drives.
D. O. James Manufacturing Co.—Speed Reducing Transmissions.
Bound Brook Oil-Less Bearing Co.—Brass and Bronze Castings.
Ulster Foundry Corporation—Grey Iron Castings.

The DIFFERENTIAL CAR



Standard on 60 Railways for

Track Maintenance
Track Construction
Ash Disposal
Coal Hauling
Concrete Materials
Waste Handling
Excavated Materials
Hauling Cross Ties
Snow Disposal

Use These Labor Savers

Differential Crane Car
Clark Concrete Breaker
Differential Bottom Dump Ballast Car
Differential Car Wheel Truck and Tractor

THE DIFFERENTIAL STEEL CAR CO., Findlay, O.

THE BABCOCK & WILCOX COMPANY

85 LIBERTY STREET, NEW YORK

Builders since 1868 of Water Tube Boilers of continuing reliability

BRANCH OFFICES

BOSTON, 49 Federal Street
PHILADELPHIA, Packard Building
PITTSBURGH, Farmers Deposit Bank Building
CLEVELAND, Guardian Building
CHICAGO, Marquette Building
CINCINNATI, Traction Building
ATLANTA, Candler Building
PHOENIX, ARIZ., Heard Building
DALLAS, TEX., 2001 Magnolia Building
HONOLULU, H. T., Castle & Cooke Building
PORTLAND, ORE., 805 Gasco Building

WORKS
Bayonne, N. J.
Barberton, Ohio

Makers of Steam Superheaters since 1898 and of Chain Grate Stokers since 1893

BRANCH OFFICES

DETROIT, Ford Building
NEW ORLEANS, 521-5 Baronne Street
HOUSTON, TEXAS, 1011-13 Electric Building
DENVER, 435 Seventeenth Street
SALT LAKE CITY, 405-6 Kearns Building
SAN FRANCISCO, Sheldon Building
LOS ANGELES, 404-6 Central Building
SEATTLE, L. C. Smith Building
HAVANA, CUBA, Calle de Aguiar 104
SAN JUAN, Porto Rico, Royal Bank Building

THE WORLD'S STANDARD

"IRVINGTON"

Black and Yellow
Varnished Silk, Varnished Cambric, Varnished Paper

Irr-O-Slot Insulation Flexible Varnished Tubing
Insulating Varnishes and Compounds

Irvington Varnish & Insulator Co.

Irvington, N. J.

Sales Representatives in the Principal Cities

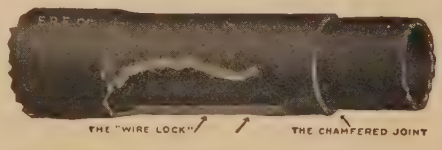
The Kalamazoo Trolley Wheels

have always been made of entirely new metal, which accounts for their long life WITHOUT INJURY TO THE WIRE. Do not be misled by statements of large mileage, because a wheel that will run too long will damage the wire. If our catalogue does not show the style you need, write us—the LARGEST EXCLUSIVE TROLLEY WHEEL MAKERS IN THE WORLD.

THE STAR BRASS WORKS

KALAMAZOO, MICH., U. S. A.

ELRECO TUBULAR POLES



COMBINE

Lowest Cost **Lightest Weight**
Least Maintenance **Greatest Adaptability**

Catalog complete with engineering data sent on request.

ELECTRIC RAILWAY EQUIPMENT CO.
CINCINNATI, OHIO
New York City, 30 Church Street

TULC
A LUBRICANT

We make a specialty of

ELECTRIC RAILWAY LUBRICATION

We solicit a test of TULC on your equipment

The Universal Lubricating Co.
Cleveland, Ohio
Chicago Representatives: Jameson-Ross Company, Straus Bldg.

B. A. HEGEMAN, Jr., President — C. C. CASTLE, First Vice-President
H. A. HEGEMAN, Vice-Pres. and Treas. — F. T. SARGENT, Secretary
W. C. PETERS, Manager Sales and Engineering

National Railway Appliance Co.

Grand Central Terminal, 452 Lexington Ave., Cor. 45th St., New York.
Munsey Bldg., Washington, D. C. 100 Boylston St., Boston, Mass.
Hegeman-Castle Corporation, Railway Exchange Building, Chicago.

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Tool Steel Gears and Pinions
Bell Locked Fare Box and Change Maker
The Aluminum Field Coils
Walter Tractor Snow Plows
Cutler-Hammer Electric Heaters
Pittsburgh Forge & Iron Co.'s Products
Genesco Paint Oils
E. Z. Car Control Corporation's Safety Devices
Garland Ventilators
Flaxlinum Insulation
Yellow Coach Mfg. Co.'s Single and Double Deck Busses
Economy Electric Devices Co.'s Power Saving and Inspection Meters
Anglo-American Varnish Co., Varnishes, Enamels, etc.
Gilmer Multiple Safety Step Treads
National Hand Holds
Ft. Pitt Spring & Mfg. Co. Springs
Turnstile Car Corporation's Turnstiles
Anderson Slack Adjusters
Feasible Drop Brake Staffs
Dunham Hopper Door Device

"POSITIONS VACANT"

Good jobs appear under this heading in the

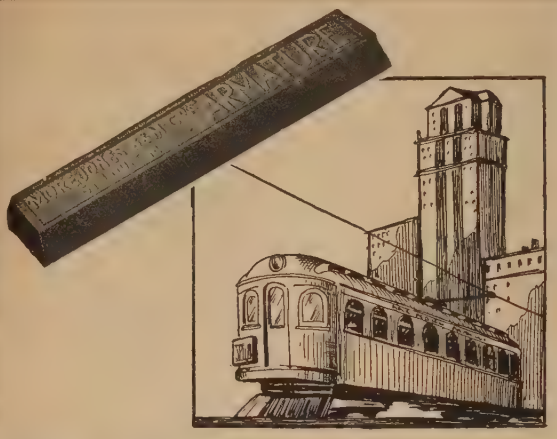
"SEARCHLIGHT SECTION"

EMPLOYERS! *Use* these columns for good men.

MEN! *Consult* these columns for good jobs.

8 cents a word. *Minimum $2.00 an insertion.*

0130



M-J Armature Babbitt

Contains no lead. The proper proportions of copper, tin, antimony and *nickel*—pure new metal—compounded under strict laboratory supervision results in a babbitt metal which successfully resists the strains and temperatures met in electric railway service in a most economical way. It can be used over and over again without deterioration.

More-Jones Brass & Metal Co.
St. Louis, Mo.

MORE-JONES QUALITY PRODUCTS

"Ventilator Tests"

A Booklet You Need!

FREE

Know what to expect of *any* street car or bus ventilator *before you buy.* This booklet outlines a plan for testing closed-vehicle ventilators and tells how N-L Ventilators perform under test. A valuable booklet — we'll gladly send you a copy of "Ventilator Tests."

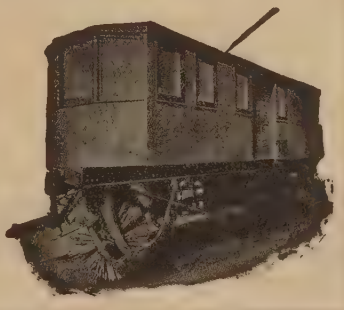
N-L

THE NICHOLS-LINTERN COMPANY
7960 Lorain Ave., Cleveland, O.
Canadian Representatives:
Railway & Power Eng. Corp., Ltd., 133 Eastern Ave., Toronto, Ont.

McGuire-Cummings Manufacturing Co.

General Offices:
111 W. Monroe St., Chicago, Ill.

Street Cars
Trucks
Snow Sweepers



NEW and RELAYING RAILS

1 TON OR 1000

TRACK EQUIPMENT

L·B·FOSTER CO.

RAIL ACCESSORIES

PITTSBURGH - PENNSYLVANIA

NEW YORK JERSEY CITY - PHILADELPHIA HAMILTON O.

PAXSON
Switch and Frog
BROOMS
Wire or Rattan
J. W. PAXSON CO.
Philadelphia, Pa.

PROVIDENCE FENDERS

H-B LIFE GUARDS

The Consolidated Car Fender Co., Providence, R. I.

Wendell & MacDuffie Co., 110 E. 42nd St., New York
General Sales Agents

ALLIS-CHALMERS

MILWAUKEE, WIS. U.S.A.

Electrical Machinery, Steam Turbines, Steam Engines, Condensers, Gas and Oil Engines, Air Compressors, Air Brakes

"The Standard for Rubber Insulation"

INSULATED WIRES and CABLES

"Okonite," "Manson," and Dundee "A" "B" Tapes

Send for Handbook

The Okonite Company

The Okonite-Callender Cable Company, Inc.

Factories, PASSAIC, N. J. PATERSON, N. J.

Sales Offices:
New York Chicago Pittsburgh St. Louis
Atlanta Birmingham San Francisco
Los Angeles
F. D. Lawrence Electric Co., Cincinnati, O.
Novelty Electric Co., Phila., Pa.
Pettingell-Andrews Co., Boston, Mass.

Canadian Representatives:
Engineering Materials Limited, Montreal.

AMELECTRIC PRODUCTS

BARE COPPER WIRE AND CABLE
TROLLEY WIRE
WEATHERPROOF WIRE AND CABLE
MAGNET WIRE
UNDERGROUND CABLE
PAPER INSULATED

Reg. U. S. Pat. Office

Incandescent Lamp Cord

AMERICAN ELECTRICAL WORKS
PHILLIPSDALE, R. I.

Boston, 176 Federal; Chicago, 112 W. Adams;
Cincinnati, Traction Bldg.; New York, 100 E. 42nd St.

AUTOMATIC SIGNALS
Highway Crossing Bells
Headway Recorders
Flasher Relays

NACHOD SIGNAL COMPANY, INC.
LOUISVILLE, KENTUCKY.

SEVEN WORKS
RAMAPO-AJAX-ELLIOT

Ramapo Ajax Corporation

HILLBURN, NEW YORK
NIAGARA FALLS, N.Y.
CHICAGO, ILLINOIS
EAST ST. LOUIS, ILL.
PUEBLO, COLORADO
SUPERIOR, WISCONSIN
NIAGARA FALLS, ONT., CANADA

RACOR

RAMAPO AUTOMATIC RETURN SWITCH STANDS FOR PASSING SIDINGS
TEE RAIL SPECIAL WORK
MANGANESE CONSTRUCTION
SALES OFFICES AT ALL WORKS
Main Office, HILLBURN, N.Y.

STANDARD

Wires, Cables, Cable Accessories
Superior quality, economical prices
Standard Underground Cable Co.
Boston Philadelphia Pittsburgh Detroit
New York Washington Chicago St. Louis
San Francisco

ROEBLING

WELDING CABLE
ELECTRICAL WIRES and CABLES
John A. Roebling's Sons Company, Trenton, N. J.

Proceed Aspect

AUTOMATIC BLOCK SIGNALS

for single track and stub end protection

United States Electric Signal Co.
West Newton, Mass.

Use

Filler and Stretcher Brick

Manufactured by

The Nelsonville Brick Co.
150 E. Broad St., Columbus, Ohio

TRADE

For dependable Line Material that will give you maximum service use

ANDERSON

MARK

Send for Latest Quotations
289-305 A Street, Boston, Mass.

ANACONDA
TROLLEY WIRE

ANACONDA COPPER MINING COMPANY
THE AMERICAN BRASS COMPANY
Rods, Wire Cable Products
NEW YORK CHICAGO

Chapman
Automatic Signals
Charles N. Wood Co., Boston

NAUGLE POLES
WESTERN & NORTHERN CEDAR
NAUGLE POLE & TIE CO.
59 E. MADISON ST. CHICAGO ILL.
New York · Columbus · Kansas City · Spokane · Vancouver · Boston

BRAZED Rail Bonds ARC WELD

Portable Arc Welding Outfits

The Electric Railway Improvement Co.
Cleveland, Ohio

100 New Users in the Last Nine Months
KASS SAFETY TREADS
HIGH
in efficiency and lasting qualities
LOW
in weight, initial and upkeep costs
Morton Manufacturing Co., Chicago

SEARCHLIGHT SECTION

USED EQUIPMENT & NEW— BUSINESS OPPORTUNITIES

UNDISPLAYED—RATE PER WORD:

Positions Wanted, 4 cents a word, minimum 75 cents an insertion, payable in advance.

Positions Vacant and all other classifications, 8 cents a word, minimum charge $2.00.

Proposals, 40 cents a line an insertion.

INFORMATION:

Box Numbers, in care of any of our offices count 10 words additional in undisplayed ads.

Discount of 10% if one payment is made in advance for four consecutive insertions of undisplayed ads (not including proposals).

DISPLAYED—RATE PER INCH:

1 to 3 inches.....$4.50 an inch
4 to 7 inches..... 4.30 an inch
8 to 14 inches..... 4.10 an inch

Rates for larger spaces, or yearly rates, on request.

An advertising inch is measured vertically on one column, 3 columns—30 inches—to a page.

B.E.J.

POSITION VACANT

GENERAL foreman who is good armature winder for small electric railway shop near New York. P-823, Elec. Ry. Journal, Tenth Ave. at 36th St., New York.

POSITIONS WANTED

CLAIM agent available, 10 years' experience, member of bar; have good reason for making change. Prefer eastern location with small company in medium sized city. Opportunity for advancement more important than salary. PW-824, Elec. Ry. Journal, Leader-News Bldg., Cleveland, Ohio.

EXECUTIVE, city or interurban; twelve years' experience, electrical engineering, master mechanic, general superintendent. Age, 35. PW-757, Electric Railway Journal, Tenth Ave. at 36th St., New York.

GENERAL foreman, 26 years' experience in tracks and special work. PW-821, Electric Railway Journal, Tenth Ave. at 36th St., New York.

MASTER mechanic or shop superintendent, 20 years' experience street railway light and heavy interurban cars, motor buses and trucks. Small or large property. PW-825 Elec. Ry. Journal, 7 So. Dearborn St., Chicago, Ill.

MR. MANAGER: Are accidents costing too large a per cent of your gross; Are your receipts diminishing due to decreasing traffic? Is the attitude of your employees of a negative nature? Are your public relations strained? Are your pull-ins too frequent? If these conditions exist on your property I offer a proven record of 22 years' street and interurban experience wherein these conditions have been developed from the worst to the best. Willing to supervise the departments referred to combined or individually. In charge of safety and educational activities with present connections. Am capable of operating medium size property supplementing supervision with original methods pertaining to safety, salesmanship and employee relations. PW-826, Elec. Ry. Journal, 7 So. Dearborn St., Chicago, Ill.

YOUNG married man desires position as inspection barn foreman or general repair work. Nine years' experience; not afraid of hard work. PW-822, Electric Railway Journal, Tenth Ave. at 36th St., New York.

"Searchlight"
is
Quick Action
Advertising

0233

FOR SALE

MOTOR CAR

1—second hand Mudge Twin Engine Gasoline, Class E-4, car No. 10131 with Adjustable Gauge; manufactured by the Railways Specialty Company, Atchison, Kansas.

Write to

C. A. HARRIS
2101 Beaver Avenue, Pittsburgh, Pa.
Attention of Mr. Poole.

FOR SALE
Immediate Delivery

ELECTRIC SHOVEL

1—Vulcan Class F. 600 v., 1½ cu. yd. capacity.

JAMESTOWN ST. RY. CO.
Jamestown, N. Y.

FOR SALE

20—Birney Safety Cars. Brill built. Seating 32.

8—Steel Interurbans, 48 ft. long. Seating 52.

ELECTRIC EQUIPMENT CO.
Commonwealth Bldg., Philadelphia, Pa.

FOR SALE

Air Compressors
16—C P 27 and 12—D H 16

TRANSIT EQUIPMENT COMPANY
Cars *Motors*
501 Fifth Ave., New York

RAILS
New and Relaying

All sections with frogs, switches carried in stock. We also purchase roads for dismantling.

M. K. FRANK
Park Row Bldg., New York
Union Trust Bldg., Pittsburgh, Pa.

Relaying Rails
NEW RAILS - ACCESSORIES
Buy Guaranteed Relaying Rails and Save 30% to 50%
1 Ton or 1000
LB FOSTER CO.
PITTSBURGH - NEW YORK CITY
PITTSBURGH, PA. NEW YORK CITY
JERSEY CITY PHILADELPHIA HAMILTON, O.

SOME ONE WANTS TO BUY

the equipment or machinery that you are not using.

This may be occupying valuable space, collecting dust, rust and hard knocks, in your shops and yards.

SELL IT BEFORE DEPRECIATION SCRAPS IT

THE SEARCHLIGHT SECTION
IS HELPING OTHERS

—LET IT HELP YOU ALSO

0128

WHAT AND WHERE TO BUY

Equipment, Apparatus and Supplies Used by the Electric Railway Industry with Names of Manufacturers and Distributors Advertising in this Issue

Accountant
James T. Swan Co.

Advertising, Street Car
Collier, Inc., Barron G.

Air Circuit Breakers
Roller-Smith Co.

Ammeters
Roller-Smith Co.

Anchors, Guy
Elec. Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Armature Shop Tools
Elec. Service Supplies Co.

Automatic Return Switch Stands
Ramapo Ajax Corp.

Automatic Safety Switch Stands
Ramapo Ajax Corp.

Axles
Bemis Car Truck Co.
Bethlehem Steel Co.
Brill Co., The J. G.
Carnegie Steel Co.
Johnson & Co., J. R.
Standard Steel Wks.
Westinghouse E. & M. Co.

Axles, Carbon Vanadium
Johnson, J. R.

Axles, Steel
Carnegie Steel Co.
Johnson, J. R.

Badges and Buttons
Elec. Service Supplies Co.
International Register Co., The

Bankers and Engineers
James T. Swan Co.

Barges, Steel
American Bridge Co.

Bearings and Bearing Metals
Bemis Car Truck Co.
Brill Co., J. G., The
General Electric Co.
More-Jones Brass & Metal Co.
Westinghouse E. & M. Co.

Bearings, Center and Roller Side
Stucki Co., A.

Bells and Gongs
Brill Co., The J. G.
Consolidated Car Heat. Co.
Elec. Service Supplies Co.

Bodies, Bus
Lang Body Co.

Boilers
Babcock & Wilcox Co.

Bolts, Standard, Special & Heat Treated
Horne & Ebling Corp.

Bond Testers
American Steel & Wire Co.
Roller-Smith Co.

Bonding Apparatus
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
Ohio Brass Co.
Railway Track-work Co.

Bonds, Rail
Amer. Steel & Wire Co.
Electric Railway Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.
Page Fence & Wire Co.
Railway Track-work Co.
Westinghouse E. & M. Co.

Book Publishers
McGraw-Hill Book Co.

Brackets and Cross Arms (See also Poles, Ties, Posts, Etc.)
Bates Expanded Steel Truss Co.
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
Hubbard & Co.
Ohio Brass Co.

Brake Adjusters
Brill Co., The J. G.
National Ry. Appliance Co.
Westinghouse Tr. Br. Co.

Brake Shoes
Amer. Br. Shoe & Fdy. Co.
Barbour-Stockwell Co.
Bemis Car Truck Co.
Brill Co., The J. G.

Brakes, Brake Systems and Brake Parts
Allis-Chalmers Mfg. Co.
Bemis Car Truck Co.
Brill Co., The J. G.
General Electric Co.
National Brake Co.
Safety Car Devices Co.
Westinghouse Tr. Br. Co.

Bridges, Steel
American Bridge Co.

Brooms, Wire & Rattan
Paxson Co.

Brushes, Carbon
General Electric Co.
Jeandron, W. J.
Le Carbone Co.
Westinghouse E. & M. Co.

Buildings, Steel
American Bridge Co.

Buses, Motor
Brill Co., The J. G.
Mack Trucks

Bushings, Case Hardened and Manganese
Bemis Car Truck Co.
Brill Co., The J. G.
Long, E. G.

Cables. (See Wires and Cables)

Cambric Tapes, Yellow and Black Varnish
Irvington Varnish & Ins. Co.

Carbon Brushes (See Brushes, Carbon)

Cars, Dump
Brill Co., J. G., The
Differential Steel Car Co.

Car Lighting Fixtures
Elec. Service Supplies Co.

Car Panel Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Cars, Passenger, Freight, Express, etc.
Amer. Car Co.
Brill Co., The J. G.
Kuhlman Car Co., G. C.
McGuire-Cummings Mfg. Co.
National Ry. Appliance Co.
Wason Mfg. Co.

Cars, Gas, Rail
Brill Co., J. G., The

Cars, Second Hand
Electric Equipment Co.
Transit Equipment Co.

Cars, Self-Propelled
Brill Co., J. G., The
General Electric Co.

Castings, Brass, Composition or Copper
Anderson Mfg. Co., A. & J. M.
More-Jones Brass & Metal Co.

Castings, Gray Iron and Steel
American Steel Foundries Co.
Bemis Car Truck Co.
Standard Steel Wks.

Castings, Malleable and Brass
Amer. Br. Shoe & Fdy. Co.
Bemis Car Truck Co.
Horne & Ebling Corp.

Castings, Steel
Horne & Ebling Corp.

Catchers and Retrievers, Trolley
Elec. Service Supplies Co.
Ohio Brass Co
Wood Co., Chas. N.

Catenary Construction
Archbold-Brady Co.

Ceiling Car
Pantasote Co., Inc.

Ceilings, Plywood, Panels
Haskelite Mfg. Co.

Change Carriers
Cleveland Fare Box Co.
Electric Service Supplies Co.

Circuit-Breakers
Anderson, A. & J. M. Mfg. Co.
General Electric Co.
Roller-Smith Co.
Westinghouse E. & M. Co.

Clamps and Connectors for Wires and Cables
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
General Electric Co.
Hubbard & Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Cleaners and Scrapers Track (See also Snow-Plows, Sweepers and Brooms)
Brill Co., The J. G.
Root Spring Scraper Co.

Clusters and Sockets
General Electric Co.

Coal and Ash Handling (See Conveying and Hoisting Machinery)

Coil Banding and Winding Machines
Elec. Service Supplies Co.

Coils, Armature and Field
General Electric Co.
Westinghouse E. & M. Co.

Coils, Choke and Kicking
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Coin Counting Machines
Cleveland Fare Box Co.
Intern'l Register Co.
Johnson Fare Box Co.

Coin Sorting Machines
Cleveland Fare Box Co.

Coin Wrappers
Cleveland Fare Box Co.

Commutator Slotters
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Commutator Truing Devices
General Electric Co.

Commutators or Parts
Cameron Elec'l Mfg. Co.
General Electric Co.
Horne & Ebling Corp.
Westinghouse E. & M. Co.

Compressors, Air
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse Tr. Br. Co.

Condensor Papers
Irvington Varnish & Ins. Co.

Condensers
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Connectors, Solderless
Westinghouse E. & M. Co.

Connectors, Trailer Car
Consolidated Car Heat. Co.
Elec. Service Supplies Co.
Ohio Brass Co

Controllers or Parts
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Controller Regulators
Elec. Service Supplies Co.

Controlling Systems
General Electric Co.
Westinghouse E. & M. Co.

Converters, Rotary
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Conveying & Hoisting Machinery
American Bridge Co.

Copper Wire
Anaconda Copper Mining Co.
Page Fence & Wire Co.

Copper Wire Instruments, Measuring, Testing and Recording
American Steel & Wire Co.

Cord, Bell, Trolley, Register
Brill Co., The J. G.
Elec. Service Supplies Co.
Internat'l Register Co., The
Roebling's Sons Co., John A.
Samson Cordage Works

Cord Connectors and Couplers
Elec. Service Supplies Co.
Samson Cordage Works
Wood Co., Chas. N.

Couplers, Car
American Steel Foundries Co.
Brill Co., The J. G.
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Cross Arms (See Brackets)

Crossing Foundations
International Steel Tie Co.

Crossing, Frog & Switch
Ramapo Ajax Corp.

Crossing, Manganese
Ramapo Ajax Corp.

Crossings
Ramapo Ajax Corp.

Crossing, Track (See Track, Special Work)

Crossings, Trolley
Ohio Brass Co.
Westinghouse E. & M. Co.

Curtains & Curtain Fixtures
Brill Co., The J. G.
Morton Mfg. Co.
Pantasote Co., Inc.

Dealer's Machinery & Second Hand Equipment
Elec. Equipment Co.
Frank, M. K.
Harris, C. A.
Jamestown Street Railway Co.
Transit Equipment Co.

Derailing Devices (See also Track Work)

Derailing Switches
Ramapo Ajax Corp.

Destination Signs
Elec. Service Supplies Co.

Detective Service
Wish-Service, P. Edward

Door Operating Devices
Brill Co., The J. G.
Consolidated Car Heat Co.
General Electric Co.
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.
St. Louis Car Co.

Doors & Door Fixtures
Brill Co., The J. G.
Consolidated Car Heat. Co.
General Electric Co.
Morton Mfg. Co.

Doors, Folding Vestibule
Nat'l Pneumatic Co., Inc.
Safety Car Devices Co.

Drills, Track
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Ohio Brass Co.

Dryers, Sand
Elec. Service Supplies Co.

Ears
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Electrical Wires and Cables
Amer. Electrical Works
Amer. Steel & Wire Co.

Electric Grinders
Railway Track-work Co.
Western Electric Co.

Electric Transmission Towers
American Bridge Co.

Electrodes, Carbon
Railway Track-work Co.

Electrodes, Steel
Railway Track-work Co.

Engineers, Consulting, Contracting and Operating
Allison & Co., J. S.
Archbold-Brady Co.
Beeler, John A.
Buchanan & Layng Corp.
Bureau of Commercial Economics, Inc.
Byllesby Co., H. M.
Day & Zimmermann, Inc.
Drum & Co., A. L.
Ford, Bacon & Davis
Hemphill & Wells
Holst, Engelhardt W.
Jackson, Walter
Kelker & DeLeuw
McD. Crawford, Norman
McClellan & Junkersfeld
Ong, Joe R.
Railway Audit & Inspection Co.
Richey, Albert S.
Sanderson & Porter
Stevens & Wood
Stone & Webster
Swan, J. T.
White Eng. Corp., The J. G.

Engines, Gas, Oil or Steam
Allis-Chalmers Mfg. Co.
Westinghouse E. & M. Co.

Fare Boxes
Cleveland Fare Box Co.
Johnson Fare Box Co.
Perey Mfg. Co.
Nat'l Ry. Appliance Co.

Fare Registers
Electric Service Supplies Co.
Ohmer Fare Register Co.

Fences, Woven Wire and Fence Posts
Acme Wire Co.
Amer. Steel & Wire Co.

Fenders and Wheel Guards
Brill Co., The J. G.
Consolidated Car Fender Co.
Root Spring Scraper Co.

Fibre and Fibre Tubing
Westinghouse E. & M. Co.

Field Coils (See Coils)

Flangeway Guards, Steel
W. S. Godwin Co., Inc.

Floodlights
Elec. Service Supplies Co.

Forgings
Brill Co., J. G., The
Standard Steel Wks.

Frogs & Crossings, Tee Rail
Ramapo Ajax Corp.

Frogs, Track (See Track Work)

Frogs, Trolley
Electric Service Supplies Co
Ohio Brass Co
Westinghouse E. & M. Co.

Furnaces, Electric Steel Melting
American Bridge Co.

Fuses and Fuse Boxes
Consolidated Car Heat. Co.
General Electric Co.
Westinghouse E. & M. Co.

Fuses, Refillable
General Electric Co.
Johns-Manville, Inc.

Garages, Steel
Austin Co.

Gaskets
Westinghouse Tr. Br. Co.

Gas Producers
Westinghouse E. & M. Co.

Gas-Electric Cars
General Elec. Co.
Westinghouse E. & M. Co.

Gates, Car
Brill Co., The J. G.

Gear Blanks
Brill Co., J. G., The
Standard Steel Wks.

Gear Cases
Chillingworth Mfg. Co.
Westinghouse E. & M. Co.

Gears and Pinions
Bemis Car Truck Co.
Elec. Service Supplies Co.
General Electric Co.
Nat'l Ry. Appliance Co.
Nuttall Co., R. D.
Tool Steel Gear & Pinion Co.

Generating Sets, Gas-Electric
General Electric Co.

Generators
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Girder Rails
Lorain Steel Co.

Gong (See Bells and Gongs)

Greases (See Lubricants)

Grinders & Grinding Supplies
Railway Track-work Co.

Grinders, Portable
Railway Track-work Co.

Grinders, Portable Electric
Railway Track-work Co.

Grinding Bricks and Wheels
Railway Track-work Co.

Ground Wires
Page Fence & Wire Co.

Guard Rail Clamps
Ramapo Ajax Corp.

Guard Rails, Tee Rail & Manganese
Ramapo Ajax Corp.

Guards, Trolley
Elec. Service Supplies Co.
Ohio Brass Co.

Harps, Trolley
Elec. Service Supplies Co.
More-Jones Brass Metal Co.
Nuttall Co., R. D.
Star Brass Works

Headlights
Elec. Service Supplies Co.
General Electric Co.
Ohio Brass Co.

Headlining
Haskelite Mfg. Co.
Pantasote Co., Inc.

Heaters, Car (Electric)
Consolidated Car Heat. Co.
Gold Car Heat. & Ltg. Co.
Nat'l Ry. Appliance Co.
Smith Heater Co., Peter

Heaters, Car, Hot Air and Water
Smith Heater Co., Peter

Helmets, Welding
Railway Track-work Co.

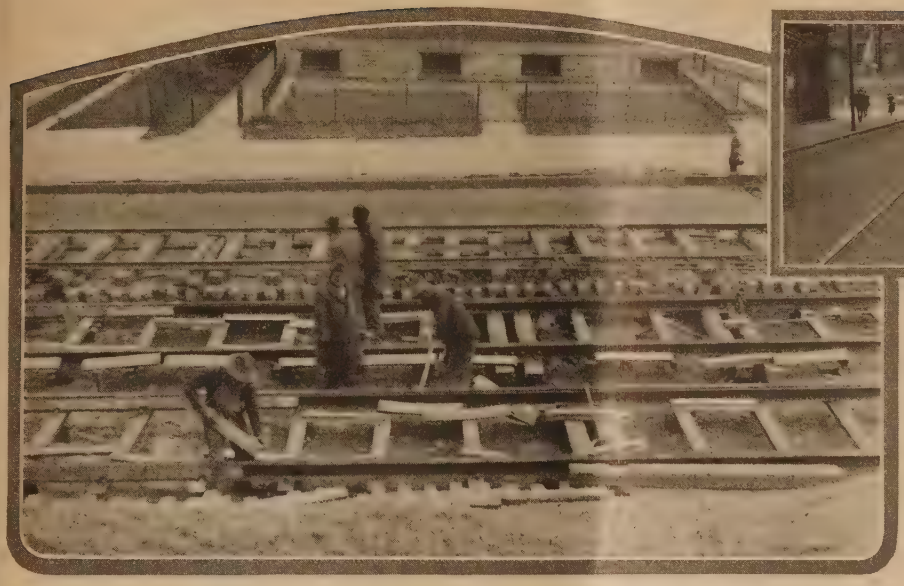
Hydraulic Machinery
Allis-Chalmers Mfg. Co.

Instruments Measuring, Testing and Recording
General Electric Co.
Roller-Smith Co.
Westinghouse E. & M. Co.

Insulating Cloth, Paper and Tape
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
Stand. Underground Cable Co.
U. S. Rubber Co.
Westinghouse E. & M. Co.

Insulating, Silk & Varnish
Irvington Varnish & Ins. Co.

Insulation (See also Paints)
Electric Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Okonite Co.
Okonite-Callender Cable Co.
U. S. Rubber Co.
Westinghouse E. & M. Co.



Above—Central Ave., Cincinnati, O. Built 1918. Carey Elastite Rail Filler used. In perfect condition. No repairs

At left — Installing Carey Elastite System of Track Insulation on Vine Street, Cincinnati, O.

Making Vine Street as Good as Central

Cincinnati was the proving-ground for the Carey Elastite System of Track Insulation. It was one of the very first cities to install Carey Elastite rail filler.

Years ago when Cincinnati relaid the wood block paving of Central Ave., Carey Elastite Rail Filler was used. Despite the heavy downtown traffic, not a block has been displaced by rail vibration, traffic-impact, or frost. The street is as smooth and watertight as the day it was laid.

The Carey Elastite System of Track Insulation—greatly improved since Central Avenue was built—was used in the reconstructing of other Cincinnati streets. Vine Street was made as good as Central Avenue. The street railway company will save money thru decreased maintenance costs and prolonged life of pavement.

THE PHILIP CAREY COMPANY
53 Wayne Avenue, Lockland, Cincinnati, O.

Send for complete data and typical construction plans.

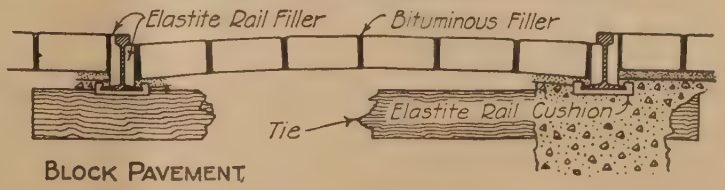
Elastite Rail Filler is Easy to Install

a tap of a mallet holds it in the web of the rail.

Carey Elastite Rail Filler is a composition of specially-tempered asphalt and fibre which is used as a resilient cushion between the rail and the pavement, absorbing traffic-impact, rail vibration and traffic-noise. It is preformed to fit any rail-section and is readily shaped on the job to fit any track-curve. It is unaffected by moisture or temperature changes and is enduring under all service conditions.

Carey Elastite

SYSTEM OF TRACK INSULATION



BLOCK PAVEMENT

Insulation Slots
Irvington Varnish & Ins. Co.

Insulators (See also Line Materials)
Elec. Ry. Equipment Co.
Elec. Service Supplies Co.
General Electric Co.
Irvington Varnish & Ins. Co.
Ohio Brass Co.
Western Electric Co.
Westinghouse E. & M. Co.

Insulator Pins
Elec. Service Supplies Co.
Hubbard & Co.

Jacks (See also Cranes, Hoists and Lifts)
Elec. Service Supplies Co.

Joints, Rail
(See Rail Joints)

Journal Boxes
Bemis Car Truck Co.
Brill Co., J. G.

Junction Boxes
Horne & Ebling Corp.
Standard Underground Cable Co.

Lamps, Guards and Fixtures
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Arc & Incandescent (See also Headlights)
General Electric Co.
Westinghouse E. & M. Co.

Lamps, Signal and Marker
Electric Service Supplies Co.
Nichols-Lintern Co.
Ohio Brass Co.

Lanterns, Classification
Nichols-Lintern Co.

Lightning Protection
Elec. Service Sup. Co.
General Electric Co.
Ohio Brass Co.
Shaw, Henry M.
Westinghouse E. & M. Co.

Line Material (See also Brackets, Insulators, Wires, etc.)
Archbold-Brady Co.
Electric Ry. Equipment Co.
Elec. Service Sup. Co.
General Electric Co.
Hubbard & Co.
More-Jones Brass & Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Locomotives, Electric
General Electric Co.
McGuire-Cummings Mfg. Co.
St. Louis Car Co.
Westinghouse E. & M. Co.

Lubricating Engineers
Texas Company
Universal Lubricating Co.

Lubricants, Oil and Grease
Texas Company
Universal Lubricating Co.

Manganese Parts
Bemis Car Truck Co.

Manganese Steel Guard Rails
Ramapo Ajax Corp.

Manganese Steel Switches, Frogs & Crossings
Ramapo Ajax Corp.

Meters (See Instruments)

Molding, Metal
Allis-Chalmers Mfg. Co.

Motor Buses (See Buses, Motor)

Motors, Electric
Allis-Chalmers Mfg. Co.
Westinghouse E. & M. Co.

Motors and Generators, Sets
Allis-Chalmers Mfg. Co.
General Electric Co.

Motormen's Seats
Brill Co., J. G.
Elec. Service Sup. Co
Heywood-Wakefield Co.
Wood Co., Chas. N.

Nuts and Bolts
Barbour Stockwell Co.
Bemis Car Truck Co.
Hubbard & Co.

Ohmmeters
Roller-Smith Co.

Oils (See Lubricants)

Omnibuses (See Buses, Motor)

Oxy-Acetylene (See Cutting Apparatus, Oxy-Acetylene)

Oxygen
International Oxygen Co.

Packing
U. S. Rubber Co.
Westinghouse E. & M. Co.

Paints and Varnishes (Insulating)
Electric Service Supplies Co
Irvington Varnish & Ins. Co.

Paints and Varnishes for Woodwork
National Ry. Appliance Co.

Paving Bricks, Filler & Stretcher
Nelsonville Brick Co.

Paving Guards, Steel
Consolidated Car Heat. Co.
W. S. Godwin Co., Inc.

Paving Material
Amer. Br. Shoe & Fdy. Co.
Nelsonville Brick Co.

Pickup, Trolley Wire
Elec. Service Supplies Co.
Ohio Brass Co.

Pinion Pullers
Elec. Service Supplies Co.
General Electric Co.
Wood Co., Chas. N.

Pinions (See Gears)

Pins, Case Hardened, Wood and Iron
Bemis Car Truck Co.
Ohio Brass Co.
Westinghouse Tr. Brake Co.

Pipe Fittings
Standard Steel Wks.
Westinghouse Tr. Brake Co.

Planers (See Machine Tools)

Plates for Tee Rail Switches
Ramapo Ajax Corp.

Pliers, Rubber Insulated
Elec. Service Sup. Co.

Pole Line Hardware
Electric Service Supplies Co.
Ohio Brass Co.

Poles, Metal Street
Elec. Ry. Equipment Co.
Hubbard & Co.

Pole Mountings
Horne & Ebling Corp.

Pole Reinforcing
Hubbard & Co.

Poles, Metal Street
Bates Expanded Steel Truss Co.

Poles & Ties Treated
Bell Lumber Co.

Poles, Ties, Posts, Piling & Lumber
Bell Lumber Co.
Naugle Pole & Tie Co.

Poles, Trolley
Bell Lumber Co.
Elec. Service Supplies Co.
Nuttall Co., R. D.

Poles, Tubular Steel
Elec. Ry. Equipment Co.

Potheads
Okonite Co
Okonite-Callender Cable Co., Inc.

Power Houses
American Bridge Co.

Power Saving Devices
National Ry. Appliance Co.

Pressure Regulators
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Pumps
Allis-Chalmers Mfg. Co.

Punches, Ticket
Intern'l Register Co., The
McGill Metal Products Co.
Wood Co., Chas. N.

Rail Braces & Fastenings
Ramapo Ajax Corp.

Rail Filler
Philip Carey Co.

Rail Grinders (See Grinders)

Rail Joints
Carnegie Steel Co.

Rail Joints—Welded
Lorain Steel Co.

Rail Welding
Railway Track-work Co.

Rails, Relaying
Foster Co., L. B.
Frank, M. K.
Transit Equip. Co.

Rails, Steel
Carnegie Steel Co.
Foster Co., L. B.

Railway Paving Guards, Steel
Godwin Co., Inc., W. S.

Railway Safety Switches
Consolidated Car Heat. Co.
Westinghouse E. & M. Co.

Rattan
Brill Co., The J. G.
Elec. Service Supplies Co.
McGuire-Cummings Mfg. Co.

Registers and Fittings
Brill Co., The J. G.
Elec. Service Supplies Co.
Horne & Ebling Corp.
Intern'l Register Co., The
Ohmer Fare Register Co.
Rooke Automatic Register Co.

Reinforcement, Concrete
Amer. Steel & Wire Co.

Repair Shop Appliances (See also Coil Banding and Winding Machines)
Elec. Service Supplies Co.

Repair Work (See also Coils)
General Electric Co.
Westinghouse E. & M. Co.

Replacers, Car
Elec. Service Sup. Co.

Resistances
Consolidated Car Heat. Co.

Resistance, Wire and Tube
General Electric Co.
American Steel & Wire Co.
Westinghouse E. & M. Co.

Retrievers, Trolley (See Catchers and Retrievers, Trolley)

Rheostats
General Electric Co.
Westinghouse E. & M. Co.

Roofing, Car
Pantasote Co., Inc.

Roofs
Haskelite Mfg. Co.

Rubber Specialties of all Kinds
U. S. Rubber Co.

Sanders, Track
Brill Co., The J. G.
Elec. Service Sup. Co.
Nichols-Lintern Co.
Ohio Brass Co.

Sash Fixtures, Car
Brill Co., The J. G.
Horne & Ebling Corp.

Scrapers, Track (See Cleaners and Scrapers, Track)

Screw Drivers, Rubber Insulated
Elec. Service Sup. Co.

Seats, Bus
Brill Co., The J. G.
Heywood-Wakefield Co.

Seats, Car (See also Rattan)
Brill Co. The J. G.

Seating Materials
Brill Co., J. G.
Heywood-Wakefield Co.
Pantasote Co., Inc.

Second Hand Equipment
Electric Equipment Co.
Frank, M. K.
Harris, C. A.
Jamestown Street Railway Co.
Transit Equipment Co.

Shades, Vestibule
Brill Co., The J. G.

Shovels
Brill Co., The J. G.
Hubbard & Co.

Side Bearings (See Bearings, Center and Side)

Signals, Car Starting
Consolidated Car. Heat Co.
Elec. Service Sup. Co.
Nat'l Pneumatic Co., Inc.

Signals, Indicating
Nichols-Lintern Co.

Signal Systems, Highway Crossing
Nachod Signal Co., Inc.
U. S. Electric Signal Co.
Wood Co., Chas. N.

Signal Systems, Block
Elec. Service Sup. Co.
Nachod Signal Co., Inc.
U. S. Electric Signal Co.

Slack Adjusters (See Brake Adjusters)

Sleet Wheels and Cutters
Anderson Mfg. Co., A. & J. M.
Elec. Ry. Equipment Co.
Elec. Ry. Improvement Co.
Elec. Service Supplies Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.

Smokestacks, Car
Nichols-Lintern Co.

Snow-Plows, Sweepers and Brooms
Brill Co., The J. G.
Consolidated Car Fender Co.
McGuire-Cummings Mfg. Co.
Root Spring Scraper Co.

Soldering and Brazing Apparatus (See Welding Processes and Apparatus)
Irvington Varnish & Ins. Co.

Special Adhesive Papers
Irvington Varnish & Ins. Co.

Special Trackwork
Lorain Steel Co.

Spikes
Amer. Steel & Wire Co.

Splicing Compounds
U. S. Rubber Co.
Westinghouse E. & M. Co.

Splicing Sleeves (See Clamps and Connectors)

Springs, Car and Truck
American Steel Foundries Co.
Amer. Steel & Wire Co.
Bemis Car Truck Co.
Brill Co., The J. G.
Standard Steel Wks.

Sprinklers, Track and Road
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.

Steel and Steel Products
Carnegie Steel Co.

Steps, Car
Brill Co., The J. G.
Morton Mfg. Co.

Stokers, Mechanical
Babcock & Wilcox Co.
Westinghouse E. & M. Co.

Stop Signals
Nichols-Lintern Co.

Storage Batteries (See Batteries, Storage)

Strain, Insulators
Anderson, A. & J. M. Mfg. Co.
Electric Service Supplies Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Strand
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Superheaters
Babcock & Wilcox Co.

Sweepers, Snow (See Snow Plows, Sweepers and Brooms)

Switches, Selector
Nichols-Lintern Co.

Switches, Tee Rail
Ramapo Ajax Corp.

Switches, Track (See Track Special Work)

Switches and Switchboards
Elec. Service Supplies Co.
General Electric Co.
Westinghouse E. & M. Co.

Synchroscopes
Roller-Smith Co.

Tampers, Tie
Railway Track-work Co.

Tapes and Cloths (See Insulating Cloth, Paper and Tape)

Tee Rail Special Track Work
Ramapo Ajax Corp.

Telephones and Parts
Elec. Service Supplies Co.

Terminals, Cable
Std. Underground Cable Co.

Testing Instruments (See Instruments, Electrical Measuring, Testing, etc.)

Thermostats
Consolidated Car Heat. Co.
Gold Car Heat. & Ltg. Co.
Railway Utility Co.
Smith Heater Co., Peter

Ticket Choppers & Destroyers
Elec. Service Supplies Co.

Ticket Punches
McGill Metal Products Co.

Ties, Mechanical
Dayton Mechanical Tie Co.

Ties and Tie Rods, Steel
Barbour-Stockwell Co.
Carnegie Steel Co.
Godwin Co., Inc., W. S.
International Steel Tie Co.

Ties, Wood Cross (See Poles, Ties, Posts, etc.)

Tools, Track & Miscellaneous
Amer. Steel & Wire Co.
Elec. Service Supplies Co.
Hubbard & Co.
Railway Track-work Co.

Torches, Acetylene (See Cutting Apparatus)

Towers and Transmission Structures
Archbold-Brady Co.
Bates Expanded Steel Truss Co.
Westinghouse E. & M. Co.

Track Grinders
Railway Track-work Co.

Trackless Trolley Cars
Brill Co., The J. G.

Track, Special Work
Barbour-Stockwell Co.
Ramapo Ajax Corp.

Transfer (See Tickets)

Transfer Issuing Machines
Ohmer Fare Register Co.

Transfer Tables
American Bridge Co.

Transformers
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Transportation Publication
Blake & Jackson's Electric Railway Transportation

Treads, Safety, Stair, Car Step
Morton Mfg. Co.

Trolley Bases
General Electric Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Bases, Retrieving
Nuttall Co., R. D.
Ohio Brass Co.

Trolley Buses
Brill Co., The J. G.
General Electric Co.
Westinghouse E & M. Co.

Trolley Material, Overhead
Anderson, A. & J. M. Mfg. Co.
Elec. Service Supplies Co.
More-Jones Brass & Metal Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Trolley Shoe
Horne & Ebling Corp.

Trolley Wheel Bushings
More-Jones Brass & Metal Co.

Trolley Wheels & Harps
Electric Service Supplies Co
More-Jones Brass & Metal Co.

Trolley Wheels (See Wheels, Trolley)

Trolley Wire
Amer. Electrical Works ..
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
Page Fence & Wire Co.
Roebling's Sons Co., J. A.

Trucks, Car
Bemis Car Truck Co.
Brill Co., The J. G.
McGuire-Cummings Mfg. Co.
Taylor Elec. Truck Co.

Tubing, Yellow & Black Flexible Varnish
Irvington Varnish & Ins. Co.

Turbines, Steam
Allis-Chalmers Mfg. Co.
General Electric Co.
Westinghouse E. & M. Co.

Turbines, Water
Allis-Chalmers Mfg. Co.

Turnstiles
Elec. Service Supplies Co.
Perey Mfg. Co., Inc.

Turntables
American Bridge Co.

Underfloor Duct Systems
Johns-Manville, Inc.

Valves
Ohio Brass Co.
Westinghouse Tr. Br. Co.

Varnished Papers & Silks
Irvington Varnish & Ins. Co.

Ventilators, Car
Brill Co., The J. G.
Nat'l Ry. Appliance Co.
Nichols-Lintern Co.
Railway Utility Co.

Voltmeters
Roller-Smith Co.

Welded Rail Joints
Electric Railway Improvement Co.
Ohio Brass Co.

Welders, Portable Electric
Electric Railway Improvement Co.
Ohio Brass Co.
Railway Track-work Co.
Westinghouse E. & M. Co.

Welders, Rail Joint
Railway Track-work Co.

Welding & Cutting Tools
International Oxygen Co.

Welding Processes and Apparatus
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General Electric Co.
Ohio Brass Co.
Railway Track-work Co.
Westinghouse E. & M. Co.

Welding Steel
Electric Railway Improvement Co.

Welding Wire
American Steel & Wire Co.
Page Fence & Wire Co.
Roebling's Sons Co., J. A.

Wheel Guards (See Fenders and Wheel Guards)

Wheel Presses (See Machine Tools)

Wheels, Car, Cast Iron
Bemis Car Truck Co.

Wheels, Car Steel and Steel Tire
Standard Steel Works

Wheels, Wrought Steel
Carnegie Steel Co.

Wheels, Trolley
Elec. Ry. Equipment Co.
Elec. Service Supplies Co
General Electric Co.
More-Jones Brass & Metal Co.
Nuttall Co., R. D.
Star Brass Works

Whistles, Air
General Electric Co.
Ohio Brass Co.
Westinghouse E. & M. Co.

Wire, Copper Covered Steel
Page Fence & Wire Co.

Wire Rope
American Steel & Wire Co.
Roebling's Sons Co., J. A.

Wires and Cables
Acme Wire Co.
Amer. Electrical Works
Amer. Steel & Wire Co.
Anaconda Copper Min. Co.
General Electric Co.
Okonite Co.
Okonite-Callender Cable Co., Inc.
Page Fence & Wire Co.
Roebling's Sons Co., J. A.
Std. Underground Cable Co.
Westinghouse E. & M. Co.

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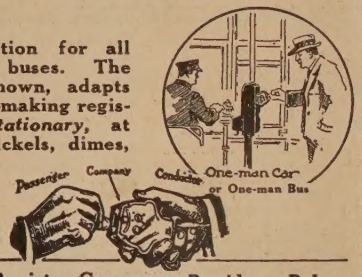

Rooke Automatic Register Company Providence, R. I.

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THE CLEVELAND FARE BOX COMPANY
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Canadian Cleveland Fare Box Co., Ltd., Preston, Ontario

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Car Heating and Ventilation

are two of the winter problems that you must settle without delay. We can show you how to take care of both, with one equipment. Now is the time to get your cars ready for next winter. Write for details.

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6209 Hamilton Ave., Detroit, Mich.

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Made in three types, Eye and Eye, Eye and Hook and Eye and Clevis.

Double-Dip Hot Galvanized the Hubbard Way.

Type B, Eye and Hook

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PITTSBURGH CHICAGO

OXYGEN, ACETYLENE, HYDROGEN

for cutting welding, etc.

Quick shipment and low prices also on cylinders, valves, torches, regulators and supplies.

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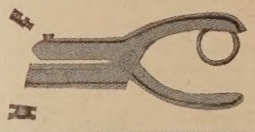
We also manufacture the Ohmer Fare Box, the Ohmer Hub-Odometer, the Ohmer Receipt Printing Taximeter, the Atco Taximeter, the Ohmer Truck Auditor, and the Ohmer Dashodometer.

Ohmer Fare Register Company
Dayton, Ohio, U. S. A.

McGill Utility Punch



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1½ inch reach. Made entirely of steel. Outwears ordinary punch. Only punch made that need not be thrown away when die wears out.

McGill Metal Products Co.
128 No. Wells St., Chicago

A Single Segment or a Complete Commutator

is turned out with equal care in our shops. The orders we fill differ only in magnitude; small orders command out utmost care and skill just as do large orders. CAMERON quality applies to every coil or segment that we can make, as well as to every commutator we built. That's why so many electric railway men rely absolutely on our name.

Cameron Electrical Mfg. Co., Ansonia, Connecticut

HORNE & EBLING CORPORATION

50 CHURCH ST., NEW YORK, N. Y.

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Brass Hardware For Cars and Buses

Motor and Controller Parts

Sterling Trolley Bases and Brakes

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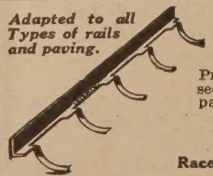

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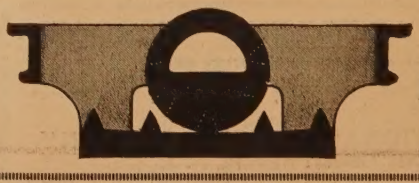
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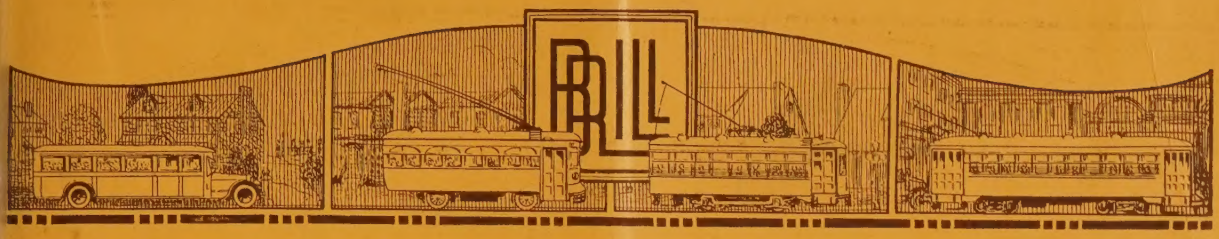

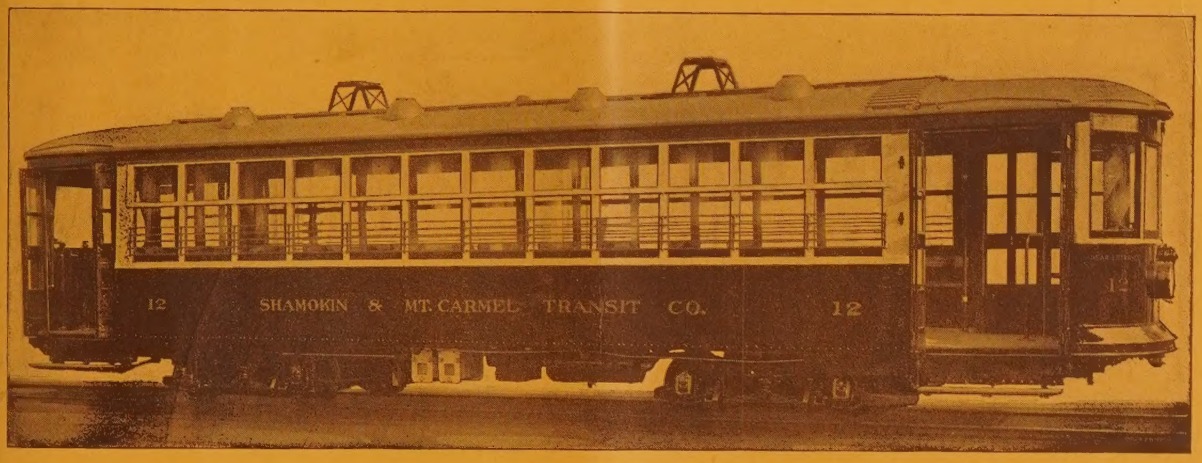

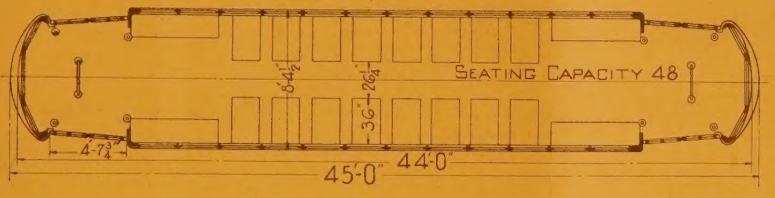

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